Professional Journal of

The Royal New Zealand Navy

TE TAUA MOANA O AOTEAROA

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1 October 2024

Dear Reader,

Welcome to this 2024 edition of the *Professional Journal of the Royal New Zealand Navy*. It follows three previous editions, all available on the internet.

This publication aims to facilitate interaction and adaptation regarding security issues facing the Navy and the wider community.

It affirms that by identifying common issues and exchanging best practices amongst ourselves and our like-minded partners we can strengthen all our security institutions, individually and collectively.

The essays in the current Journal alert us to emerging security challenges that face the Navy, the New Zealand Defence Force, and our nation. They distil the wide career experiences and keen professional judgements of its contributors, both Navy and civilians, and they propose thoughtful courses of action.

In short, this Journal hopes to share the authors' constructive insights with you and with all readers in the wider security community of New Zealand and its partners.

The editorial team and I commend their essays to you.

Sincerely,

Stephen Hoadley (Dr)
Honorary Captain RNZN
General Editor

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TE TAUA MOANA O AOTEAROA

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The New Zealand Warriors of the Sea

COVER IMAGE

The artefact is a carving of a Māori waka prow with pāua inlay. The carving was made from one of the stocks that HMNZS *Te Mana* was built on. It is believed to have been presented to the ship by the Māori Queen, Dame Te Atairangikaahu. She was patron of *Te Mana* and launched the ship in Melbourne in 1997. She was also guest of honour of the commissioning ceremony in 1999.

TE TAUA MOANA NAVY

HEI MANA MŌ AOTEAROA
A FORCE FOR NEW ZEALAND

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PART 3: ADAPTING TO THE FUTURE

BOOK REVIEWS

FOREWORD

COMMODORE MAXINE LAWES, RNZN

Commander Defence Logistics Command, NZDF

It is my pleasure to offer the foreword to this timely 2024 edition of the *Professional Journal of the Royal New Zealand Navy*. Especially pleasing is the opportunity to remind readers of the importance of logistics to the NZDF and to the RNZN.

The great General Napoleon Bonaparte is commonly quoted as saying 'An army marches on its stomach.' But in the past, logistics has often been considered secondary or an afterthought. Recently, though, decision-makers around the world have come to understand what logisticians have always known, that "amateurs talk tactics; the professionals talk logistics"! Logistics and sustainment not only are enablers of specific actions, but also contribute to all aspects of military outputs and ultimately to achieving national interests.

Among the thoughtful essays within this edition is one especially relevant to me, by Mr Andrew Curlewis, who describes how the Future Force Design Principles (FFDPs) are likely to shape the NZDF's future support systems. Curlewis highlights the integration of assessment management, supply chain and inventory management, and crew training and operational planning. His identification and illuminating discussion of these fundamentals demonstrates how far logistics and sustainment have developed and been increasingly recognised.

A key organisation in the support system of the NZDF is the Defence Logistics Command (DLC). Evolving and maturing since its inception in 2010, the DLC is a joint organisation made up of Logistics Commands Maritime, Land and Air; Defence Equipment Management Organisation; Defence Supply Chain Management; and Defence Shared Services Group. Its purpose is to undertake the delivery of logistic support and shared services required to maintain and sustain capability and operations. The DLC is responsible for the provision of logistics, maintenance, repair and overhaul, engineering, and shared services functions

in support of the Navy, Air Force, Army, and Headquarters Joint Forces New Zealand. Its logistics and shared services functions are key enablers of NZDF capability sustainment and operational readiness.

The FFDP Sliding Principle 6, "Partnership", is highlighted by Mr Curlewis. He touches on how an effective partnered approach would consider a wide range of strategic relationships. The DLC has a number of strategic partners and a multitude of suppliers, manufacturers, and service delivery organisations that are integral to delivering the logistics effect. This enables operational readiness to be achieved and outputs to be delivered and sustained. These relationships have evolved from being mainly transactional to more long-term and relationship-based, involving real collaboration and sharing of skills and information. Some of our larger commercial partners in New Zealand are also international companies that support our allied and partner militaries around the world. This provides the opportunity for the NZDF, including the RNZN, to share our innovations.

We live in a world of global logistic challenges, from ongoing supply chain disruptions due to the COVID-19 pandemic, compounded through Russia's invasion of Ukraine and conflict between Israel and Hamas, to the recent Houthi attacks on ships in the Bab Al Mandab Strait. These events and subsequent military actions have highlighted the vulnerabilities of the global supply chain, which, for decades of relative peace, has been structured as a "just-in-time" system. The conflicts in Europe and the Middle East have demonstrated the importance of logistics of scale or mass to support not only flare-ups of high-intensity warfighting, but also sustained conflict. There is a drive to re-build long-term military-industrial capacity and capability, not only in the Northern Hemisphere but also in the Pacific region.

This is an exciting time to be involved in the whole spectrum of logistics as the NZDF, including the RNZN, not only grapples with global logistic challenges but also introduces new capabilities into service and supports or retires ageing capabilities. Other challenges to be faced in the future include uncertainties of supply chain resilience, technological change, and supply chain assurance – knowing where the supply chain originates. I endorse Curlewis's conclusion that our support systems will need rapidly to evolve and innovate, so as to be able to meet the needs of the RNZN and the wider NZDF as the future unfolds. Many of these needs are identified in the following essays, which I recommend to RNZN and NZDF personnel, officials, commercial partners, and partner militaries.

COMMODORE MAXINE LAWES, RNZN

Commodore Maxine Lawes, RNZN, was commissioned from the ranks in 1990 and subsequently served aboard HMNZ Ships *Endeavour, Canterbury*, *Wellington*, *Te Kaha* and *Monowai*. Her shore postings included Responsibility Centre Financial Advisor, Assistant to Captain Fleet Support, Aide-de-Camp to Governor General Dame Catherine Tizard, Deputy Director of Naval Finance, Assistant Director Military Allowances and Logistics Commander Maritime. She attended the US Naval Staff College, the Australian Command and Staff College and the Australian War College. Following her posting as Base Commander of HMNZS *Philomel* she was appointed Assistant Chief of Navy Delivery and, for a short time, Acting Deputy Chief of Navy and was awarded a Chief of Navy commendation. In 2023 Commodore Lawes was promoted to Commodore and appointed to her current role as the Commander Logistics, Defence Logistics Command.

EDITORIAL

Photo credit: Chris Loufte

HONORARY CAPTAIN DR STEPHEN HOADLEY

General Editor, *Professional Journal of the Royal New Zealand Navy*

The preparation of Volume 4, 2024, for publication has been a team effort. I commend Captain Shane Arndell, RNZN; Commander Tony Masters, RNZN; Lieutenant Commander Richard Davies, RNZN; Portfolio Manager Russell Martin; Managing Editor Madison Hamill; Cover and Illustrations Editor Andrew Bonallack; Book Review Editor Commander Andrew Dowling, RNZN; Text Editor Elizabeth Lincoln; and Alyson Douglas, Deputy Director International Engagement (Navy), for helping to maintain the aim and achieving a brilliant outcome... on schedule and within budget.

This volume features a foreword by Commodore Maxine Lawes, RNZN, Commander Logistics, Headquarters Defence Logistics Command. She reminds us of the essential roles played by real-time logistics and longer-term support systems that keep the people, ships, aircraft, and fighting capabilities of the NZDF maintained, operational, and deployed.

In the body of this volume, I have grouped the selected essays into Part 1: “Learning from the Past”, Part 2: “Strengthening the Present”, and Part 3: “Adapting to the Future”. Lieutenant Commander Richard Davies, RNZN, leads off Part 1 with insights into the importance of naval forces in colonial New Zealand and in two world wars, and how we adapted to new geopolitical realities by shifting our security alignment from the Empire to the United States. Captain John Sellwood, RNZN, then demonstrates the fundamental influence of geography on the foreign, economic, and security policies of New Zealand. He notes that focussed and efficient governments, even small ones, can transcend the limitations of geography, as New Zealand has done. An awareness of threats guides Part 2: “Strengthening the Present”. The first three essays share a concern about China’s rising influence. Warrant Officer Wayne Mitchell sounds a warning about China’s recent initiatives in the Pacific islands, compounded by climate change and rising sea levels, and their impact on New Zealand’s security. Captain Andrew Watts, ONZM, RNZNR, has devised two thoughtful scenarios, which, although

hypothetical, help clarify how particular actions by "Continentia" might manifest in the region of "Islandia" and what the NZDF and RNZN could, and should, do to manage the consequent threats. Mr. José Miguel Alonso-Trabanco points out the initiatives of China and other powers in the Antarctic and warns that New Zealand must be prepared to respond to a "new Great Game" of shifting geopolitical rivalries. Captain Rodger Ward, RNZN, reminds us that keeping aware of information threats and conducting information warfare is the job not only of communications and IT specialists, but also of all RNZN personnel. Dr Jim Rolfe and Mr Derek Gill describe how they evaluated the RNZN combat fleet and suggest that their unique methodology can be applied more widely to guide prioritisation and budgeting.

Part 3: "Adapting to the Future" sets out four forward-looking essays. Retired Royal Navy Vice Admiral Paul Bennett, writing with the perspective of his United Kingdom and NATO experience, recommends that the New Zealand defence establishment develops a better appreciation of the demands of multi-domain warfare and adapts its strategic culture accordingly. Mr Andrew Curlewis sets out the prescriptions of the Future Force Design Principles and their implications for the RNZN's support systems, a theme that resonates with Commodore Lawes' foreword. Lieutenant Isaac Wade, RNZN, informs the reader of the current civilian applications, and potential uses by the NZDF and RNZN, of hydrogen as a more economical and less carbon-emitting fuel than current petrol and diesel fuels. Mr Michael Vredenburg describes how the RNZN could draw lessons from the initiatives of the Coastwatchers during World War II to expand New Zealand's coastal and island surveillance capacity in future. This regional situational awareness is especially important considering the shifting geo-politics of the island region and need not be prohibitively expensive if managed skilfully.

Readers aware of intensifying political tensions and armed conflicts in Europe, the Middle East, and East Asia know that New Zealanders no longer enjoy a benign strategic environment. The common theme of the essays in this volume is our need to acknowledge that geo-political strife "over there" undermines New Zealand's security "over here", and to be prepared to respond as a nation. This theme is reiterated by Commander Andrew Dowling, RNZN, and Commander Wayne Andrew, RNZN, and implied by Lieutenant Commander Marc Griffiths, RNZN, and Commander Alex Trotter, RNZN, in their timely book reviews.

Meeting the emerging security threats requires not only astute political leadership, skilful diplomacy, and a sound economy, but also a capable and well-resourced NZDF. The ability to defend our shores and waters, to assist our Pacific island neighbours, to contribute to partnerships with like-minded states, and to support the rules-based international order are the missions to which the RNZN is dedicated.

The scope and depth of the essays in this volume are evidence of the authors' keen awareness of international uncertainties, and also of their commitment to improving the RNZN's ability to play a constructive role in achieving New Zealand's national interests. They present lessons from history, geography, technology, and partnerships to prepare the RNZN in the present to cope better with the challenges of the future. Agree or disagree with their critiques and assertions – they aim to stimulate constructive ideas and motivate institutional reform. I recommend them, one and all.

HONORARY CAPTAIN DR STEPHEN HOADLEY

Dr Stephen Hoadley, Honorary Captain RNZN, recently retired as Associate Professor of International Relations at The University of Auckland. He is the author of seven books, including *The New Zealand Foreign Affairs Handbook* and *New Zealand United States Relations*. He was general editor of a five-volume series on International Human Rights and three other books, including *Asian Security Reassessed*. A former US Navy officer and current media commentator and public speaker, he is an Honorary Professor of the NZDF Command and Staff College.

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The views and opinions expressed or implied within the *Professional Journal of the Royal New Zealand Navy* are those of the authors and do not necessarily reflect those of the Royal New Zealand Navy or the New Zealand Government.

PART 1: LEARNING FROM THE PAST

Historic recruitment poster | National Museum of the Royal New Zealand Navy

NAVAL OPERATIONS AND ALIGNMENTS IN NEW ZEALAND'S HISTORY

Lieutenant Commander Richard Davies, RNZN

Historically, New Zealand's maritime strategy has been straightforward: to align with more powerful friendly states. As Lieutenant Commander Richard Davies, RNZN, points out, New Zealand's colonial naval formations and activities were embedded in the British Empire and its Royal Navy. But this proved to be unsatisfactory over time, and New Zealand, while retaining emotional links to the Empire and later the Commonwealth, and hoping briefly but vainly that the United Nations would provide security, aligned its defence interests with those of the United States. The lesson of history is that to earn the support of likeminded security partners in the current era, New Zealand must maintain a credible Defence Force, of which the RNZN is a vital element.

New Zealand's history, shaped not least by its insular geography,[1] clearly illustrates the necessity not only of self-defence but also of alignment with a friendly power. The Royal Navy mentored New Zealand's nascent naval forces to become an instrument of national defence and also a key element of our international relationships. New Zealand benefitted from the worldwide presence and capability of the Royal Navy as it ensured that the Empire maintained a global focus that included and protected New Zealand. In 1941, that became inadequate, and New Zealand re-aligned its naval efforts towards the United States (US) and, to a lesser extent, Australia, while retaining emotional ties to the Empire and later the Commonwealth and the United Nations.

This essay examines the development of New Zealand's naval capacity, operations, and alignments through four phases: pre-First World War (WWI), post-WWI, Second World War (WWII) and post-war. It concludes that maintaining a credible navy has been, and still is, an imperative if New Zealand is to protect its interests and retain the support of its many like-minded security partners.

Pre-First World War – Colonial New Zealand and the Royal Navy

New Zealand's relationship with the Royal Navy began in 1769 when Lieutenant James Cook, RN, in HM Bark *Endeavour*, began mapping the waters of the Pacific islands. In 1837, the British Government dispatched HMS *Rattlesnake* under Captain William Hobson, RN, to provide security for British residents in New Zealand. In 1839, Hobson, now appointed Lieutenant Governor, led negotiations with Māori chiefs to conclude the Treaty of Waitangi, subsequently proclaiming New Zealand to be a British colony.

1 As the University of Waikato's Dr Reuben Steff put it, 'Geography dictates Wellington's grand strategy: trade routes - as well as invasion routes - into New Zealand are the seas; global trade depends on freedom of navigation and naval threats must be intercepted by a global naval power.' See Steff, "The Biden Administration", 10.

Following 1840, the Royal Navy acted as a security force for the colonial government. Land garrisons were small and their mobility was limited by the terrain and lack of adequate roads, so the Royal Navy adapted. As well as providing disciplined armed men, the Royal Navy's ships could use riverine and coastal transport routes to move forces quickly around the country as required. At least initially, gunboats and other naval forces were a practical and reliable security asset.

When the first skirmishes of the New Zealand Wars took place at Kororāreka in March 1845, HMS *Hazard* was sent north from Auckland to support the garrison. At the Battle of Ruapekapeka in 1846, British forces attacking rebels Hone Heke and Te Ruki Kawiti included sailors and marines from six ships. The colonial authorities also converted a 32-foot boat into a gunboat, which saw action on the rivers and harbours of New Zealand.[2]

In 1860, sailors from HMS *Niger* participated in land battles in and around Taranaki, and the ship itself provided naval gunfire support. Later the same year, a Naval Brigade was formed, which grew to 628 officers and men and participated in a number of engagements before being disbanded in 1861.[3]

During this conflict, the New Zealand Government began developing its own naval capacity. Between 1863 and 1870 a fleet of gunboats made up of commandeered civilian ships and purpose-built craft gave the British control of the strategically important Waikato River and Manukau Harbour, which proved essential to the success of British Army campaigns.

While fighting the New Zealand Wars, the government also conducted a political campaign with London to secure a permanent naval establishment in New Zealand. The Pacific Command of the Royal Navy was established in 1829, and the Australian Station (based in Sydney) was established in 1859 to provide naval support to Australia and New Zealand. However, the New Zealand Government was not satisfied with these arrangements, considering that the fleet spent too much time in Australia rather than in New Zealand.

In 1887, the colonial premiers met in London and agreed that the existing

2 Howard, *Portrait of the Royal New Zealand Navy*, 5.

3 Ibid, 6.

HMS *New Zealand* arriving in Wellington, 1919 | National Museum of the Royal New Zealand Navy

naval force would be supplemented by additional units, two of which were to be stationed in New Zealand, with Australia and New Zealand contributing to the cost of the additional vessels.[4] Further vessels were provided for in 1902. These changes were implemented in the Australian and New Zealand Naval Defence Act 1903, which provided for a fleet on the Australian Station consisting of an armoured cruiser, two second-class cruisers, four third-class cruisers, and four sloops. The force would be based in Australia and New Zealand and operate in the waters of Australia, China and the East Indies, or 'where the Admiralty believes they can most effectively act against hostile vessels which threaten the trade or interests of Australia and New Zealand.'[5] The Act also provided for two Royal Navy cadetships annually for New Zealand boys. In February 1905, an old gunboat HMS *Sparrow* was sold to New Zealand, and renamed *Amokura*. This enabled training of cadets for naval or merchant service.[6]

At this point, New Zealand depended on the Royal Navy for its maritime security. It is clear from Imperial Defence Conferences of 1905 and 1911 that New Zealand saw the solution to its maritime security concerns as a Pacific-wide fleet, with stations in Australia and New Zealand (as well as in Canada and China), managed by the Royal Navy and controlled by the Admiralty. The Royal Navy would provide ships and crews, and the dominions, Australia, New Zealand, and Canada, would contribute to the running costs, and assign some personnel.

This view was not universally held. Both Canada and Australia considered the Pacific too big for the Royal Navy to police alone, and were concerned that in a European conflict the first priority of the Royal Navy would be Europe, not the Pacific. Both, therefore, began developing their own national navies. Moreover, the dominions had other reservations. Britain continually reduced the number and capability of ships to be stationed in the Pacific and substituted second class cruisers for armoured ships, and then third-class cruisers for second-class cruisers. In general, it was outdated ships no longer considered suitable for service in Europe that were sent to the Pacific.

4 "Agreement as to Additional Force", 507.
5 Australian and New Zealand Naval Defence Act 1903.
6 Howard, *The Navy in New Zealand*, 23.

HMS *Philomel*, Wellington, 1917 | National Museum of the Royal New Zealand Navy

In 1904, First Sea Lord Admiral Fisher fundamentally reshaped the Royal Navy by scrapping 154 ships deemed 'too weak to fight, and too slow to run away'[7] thus drastically reducing the pool of ships from which the Pacific Fleet could be drawn. In response, Australia decided to form its own navy.[8] Australia's decision, though, had ramifications for New Zealand. Britain saw Australia and New Zealand as a single strategic entity. An independent Australian Navy could lead the Royal Navy to withdraw from the Australian Station, forcing New Zealand to participate in the Australian project, or meet the entire costs of its own naval defence.

Joseph Ward, the then New Zealand Premier and Minister of Defence, was more focussed on collective security provided by the Empire, believing 'There is but one sea around our shores, and... with one sea and one Empire, there should in reality be but one Navy.'[9] Ward increased the annual naval subsidy New Zealand paid to Britain from £40,000 a year to £100,000 from 1908, and offered to provide up to two first-class battleships for the Royal Navy. At the time, the Liberal Government in London and the Admiralty were in the grip of a struggle over the number of dreadnoughts required to keep pace with the German Navy's building programme. With a population of just over one million, and total government revenue of £9 million,[10] New Zealand's offer to Britain of two major warships valued at £2 million each was indeed generous, and Britain accepted it with alacrity.

Ward's motives have been subject to speculation ever since. Historian Michael King referred to them as 'rash promises',[11] and there is a general consensus that Ward suffered from an excess of patriotism. This may be right, and furthermore it was expensive patriotism, costing approximately four pounds for every New Zealand citizen at the time. New Zealand only finished paying for the ships in 1944, 23 years after they were scrapped.

The episode, though, may be more complex, and Ward's motives more sophisticated than just simple patriotism. The Australian colonies had formed the Commonwealth of Australia in 1901 and New Zealand, although invited to participate, chose not to.[12] Although the two colonies were integrated for a time following 1840, there had been a steady process of "disengagement" by New Zealand ever since. This was in keeping with New Zealand's orientation to the largest global maritime power, Great Britain, rather than a smaller embryonic power, Australia, even though the latter was closer to New Zealand.

Realistically speaking, just as there was concern about the Royal Navy being focussed on the North Sea, an Australian navy would be focussed on Australian interests, not those of the Empire and specifically New Zealand. New Zealand would then be faced with funding its own fleet or revisiting its decision to not join the Australian Federation. The cost of a New Zealand fleet would have been in the vicinity of £750,000 annually.[13] Politically, joining the Australian Federation was never an option,[14] and even so, joining would not guarantee that New Zealand's naval interests would receive due consideration.[15]

Ward may have seen a third alternative. If the Royal Navy could be encouraged to remain engaged in the region, Australia's perceived need for a separate fleet would be negated, which would preserve both New Zealand's independence and its role in the wider Empire. Failing that, making a substantial contribution to the Royal Navy, in both money and battleships, could create a situation where the Admiralty felt obliged to station major units in New Zealand. After all, they would have been "New Zealand's" ships.

If that was his intention, it appeared to bear fruit at the Imperial Defence Conference in 1909, which agreed to

7 Massie, *Dreadnought*, 463.
8 Howard, 24.
9 Colonial Conference 1907 Minutes of Proceedings, 133.
10 Consolidated Fund–Revenue, 1901-2 to 1910-11.
11 King, 293.
12 Even today, the Australian Constitution contains provisions for New Zealand to federate, we just have to make the choice.
13 *Marlborough Express*, August 29, 1913.
14 It is hard to pinpoint the reason the antipathy existed at that time - and continues today. It is a subject worth further study.
15 There may be some substance to this. In 1942, rumours of plans to abandon Northern Australia to the Japanese emerged. Their accuracy is in doubt, though there were plans for a "scorched earth" retreat in case of a Japanese invasion. See Paul Hasluck, "The Government and the People 1942-1945", *Australia in the War of 1939-1945*, Vol. II, Australian War Memorial, 1970, 711-717.

establish a Pacific Fleet with HMS *New Zealand*[16] as the flagship. Part of the fleet would be stationed in New Zealand waters and manned as far as possible by New Zealanders. Australia would provide the battle cruiser HMAS *Australia*, three light cruisers and two submarines.[17] However, like all plans, this one did not survive first contact with reality. What was finally sent to the Australian Station were the two 'unspeakably useless' cruisers HMS *Psyche* and HMS *Pyramus*.[18] New Zealand also purchased the even older cruiser HMS *Philomel* for use as a training ship. As for the New Zealand flagship, the Admiralty determined the battle cruiser was of more use as part of the Home Fleet, to which it was eventually assigned.

The net effect was that New Zealand funded the construction of a battlecruiser it hoped would ply Pacific waters to protect New Zealand. But the ship made only two courtesy visits to New Zealand and was scrapped half way through its life to meet Britain's obligations under the Washington Treaty.

The First World War

Britain's ability to prevail in the Great War depended on its Empire relationships. It did not have access to the food and raw materials domestically that it needed to prosecute the war, but it did have the money and the command relationship with its offshore "branch offices" (dominions and colonies). Countries of the Empire provided the additional manpower, food and industrial capacity to successfully blockade Germany until the combined weight of French, British and ultimately American industrial power could achieve victory.

The colonial linkage went both ways, of course. It was in New Zealand's interests to join the fight against Germany. New Zealand's survival depended on Britain remaining an economically viable market for New Zealand produce, which in turn was crucial to Britain's victory. What historian James Belich refers to as the "Protein Bridge" was vital to both.[19]

Pre-war strategic assessments identified the greatest threat to New Zealand as being commerce raiders, and events of the war bore this out. Two raiders in particular – SMS *Wolf* and SMS *Seeadler* (sea eagle) – conducted operations in the New Zealand area. SMS *Wolf* sank two merchant ships and laid mines off the New Zealand coast, which subsequently sank two more vessels.[20] SMS *Seeadler*, commanded by Count Felix von Luckner, captured or sank 15 ships in the Pacific and Atlantic, until being wrecked ashore by a tidal wave in the Society Islands (French Polynesia). The crew escaped, but were eventually captured by the British in Fiji. Von Luckner was taken to New Zealand and imprisoned on Motuihe Island in Auckland's Hauraki Gulf. In December 1917, with a group of German merchant navy cadets, he seized a motor boat and escaped, evading capture for over a week.[21]

These incidents aside, it is virtually impossible to identify a distinct New Zealand contribution to the naval warfare. New Zealand continued funding the Royal Navy, and New Zealanders served in Royal Navy ships operating across the globe. HMS *New Zealand*, under Royal Navy command, participated in all major fleet actions of the war, and was one of the few *Invincible*-class battlecruisers[22] to come through the war unscathed. After Jutland exposed the vulnerabilities of the class to plunging fire,[23] HMS *New Zealand*, along with the remainder of the battlecruisers, was docked for modifications and took no further part in the war. New Zealand's other vessel, HMS *Philomel*, conducted operations mainly in Middle Eastern waters. She returned to New Zealand for a refit in 1917 and remained alongside for the remainder of the war.

New Zealand personnel made other contributions. Lieutenant Commander William Sanders, RN, was awarded a posthumous Victoria Cross for his actions against German

16 Although a battleship was offered, the simple realities of ship building (slip space, availability of guns and turrets and so on) saw it replaced by the *Invincible*-class battle cruiser.
17 Howard, 25.
18 Wright, 34.
19 Belich, 66.
20 Manatū Taonga, German auxiliary cruiser SMS *Wolf*.
21 Titchener, *The Von Luckner Incident*.
22 There does not appear to be any definitive description of the class of ship HMS *New Zealand* was. She has been variously described as *Indomitable* or *Invincible* class. I have preferred the latter.
23 HM Ships *Indefatigable*, *Queen Mary*, and *Invincible* were sunk at Jutland, and another battle cruiser HMS *Hood* was sunk early in the Second World War by plunging fire penetrating the weak deck armour.

submarines when in command of the Q-ship[24] HMS *Prize* off Ireland in 1917. Lieutenant Commander Bernard Freyberg, RN, commanding the Hood Battalion of the Royal Naval Division, was awarded the Victoria Cross for his leadership in operations in France.

A task force of HMS *Psyche* and HMS *Pyramus* escorted ships carrying 1400 troops to capture the German colony of Samoa, 1500 nm north of New Zealand, to deny a refuelling depot to the German East Asiatic Squadron, commanded by Vice Admiral Graf von Spee, KM. Although the capture was without incident, the New Zealand force arrived in Apia soon after von Spee's heavy cruisers SMS *Scharnhorst* and SMS *Gneisenau* had left, raising the possibility that the badly outgunned New Zealand cruisers could have faced disaster in a shoot-out with the Germans. The German squadron went on to sink HMS *Monmouth* and HMS *Good Hope* at the Battle of Coronel before being itself subsequently sunk at the Battle of the Falklands. If the squadron had encountered the New Zealand convoy, the "unspeakably useless" escorts would have gone to the bottom with those ships. It is sobering to speculate on the effect on the weakening of New Zealand's military capability had we lost 1400 soldiers in the first few months of the war due to our failure to exercise sea control in our immediate region.

If, prior to the war, there was a spirit of martial enthusiasm among local militias and territorial forces, by the end of the war a more sober attitude had emerged. The scale of losses was such that the dead became martyrs,[25] commemorated in quasi-religious Anzac ceremonies honouring the "glorious dead". Memorials were erected in small towns and large throughout the country, inscribed with the names of the dead and the words "Lest We Forget".

The inter-war period

The period between the two world wars was one of significant change internationally and domestically. Social conditions changed, a socialist government with pacifist inclinations was elected, the impact of the carnage moderated the unthinking alignment with the Empire, and technology held out the hope of "bloodless" wars. Immediately following the war there was a general de-militarisation of the country.

The country was, though, still taking maritime defence seriously. Admiral of the Fleet Viscount Jellicoe, RN, visited New Zealand to advise on appropriate naval arrangements for New Zealand. He also conducted a similar analysis on behalf of the Australian Government. His report was completed in 1919 and covered the strategic situation and recommendations for the future naval forces in New Zealand.

His strategic assessment had two main elements:

> *The trade of New Zealand is dependent on the security of her sea communications.*
>
> *It is not possible to consider the naval requirements of New Zealand without taking into account also the naval requirements of the Pacific and Indian Oceans as a whole...*[26]

He recommended a fleet of some 130 ships, including eight battleships, eight battle cruisers and 40 destroyers, under Admiralty command, to be funded on a pro-rata basis by the Empire governments. The major recommendation for New Zealand was to establish the New Zealand Division of the Royal Navy. The ships and personnel would be lent by the Royal Navy, but administered by a New Zealand Naval Board. New Zealand could also, as circumstances permitted, add its own units to the larger fleet.[27]

Jellicoe's timing was not good. A fall in export prices pushed the country into depression, and Jellicoe's grand scheme for New Zealand got little sympathy. Nevertheless, the government did establish the New Zealand Division and the Naval Board. The light cruiser HMS *Chatham* was the first of a long line of ships lent by the Admiralty, along with sloops such as HM Ships *Laburnum*, *Veronica*, and *Wellington*. The sloops were attached to the

24 Q-ships were heavily armed ships disguised as unarmed merchant ships. The U-boat acting under the accepted rules of war would surface close to the ship to allow it to surrender. At that point, the merchant vessel would drop its disguise and attack the submarine.

25 Belich, 116, refers to the creation of 18,000 "Kiwi Christs".

26 Jellicoe, *Report of Admiral of the Fleet Viscount Jellicoe of Scapa*, 12.

27 A unit was defined as a light cruiser, two destroyers and two submarines.

New Zealand Division but were, to all intents and purposes, Royal Navy ships that spent most of their time on South Pacific cruises. HMS *Veronica* was alongside in Napier in 1931 when a major earthquake struck, devastating the city. Joined by HM Ships *Dunedin* and *Diomede*, sailors assisted in recovering the injured and cleaning up the debris. The first communications to the rest of New Zealand were via HMS *Veronica*'s wireless facilities. The RNZN has maintained a close relationship with Napier to this day.

One of the key elements of Jellicoe's report was the establishment of a major naval base in Singapore. With substantial financial commitments from New Zealand and Australia, Britain commenced construction. But before the money was paid, a new British government decided the base was not required and terminated the project. New Zealand then canvassed options for additional cruisers to bolster local defences, and an additional cruiser arrived on station in 1926.

A further change in government in Britain meant that Britain then decided to resume the Singapore project, again soliciting donations from the dominions. New Zealand was, at that point, maintaining two cruisers, considering a third, and being asked to contribute to the base at Singapore. New Zealand decided to contribute £1 million to the Singapore base over 10 years, and to maintain the two cruisers of the New Zealand Division. They would not proceed with the third cruiser, but the existing ships would be replaced with the new *Leander*-class[28] cruisers.[29]

In 1938, "Fortress Singapore" was incomplete and did not have landward defences. Constraints on the British economy with the depression, and naval cuts to comply with the Washington Treaty, meant it was unlikely the major fleet it was supposed to support would get to Singapore before hostilities commenced. Senior civil servant Gerald Hensley asserts that the New Zealand Prime Minister's discussions with the British Government had two consistent themes: Britain could not afford two fleets, and New Zealand's best option for defence was to cooperate, on land and in the air, in the defence of the Empire.[30]

Between the wars, New Zealand's strategic perspective had been shifting, and the Empire link came under particular strain with the election of the Labour Government in 1935. The carnage of WWI and the effects of the Great Depression inclined the new government to spend less money on arms and more on social services. Elected on a platform of social reform, they instituted a range of reforms to support the poor and unemployed, which led historian

28 Modern fast cruisers with 6-inch guns.
29 Statement to the House by the Prime Minister the Right Honourable J.G. Coates, April 23, 1927.
30 Hensley, *Beyond the Battlefield*, 35.

Draft going to HMS *Wakakura*, 1939 | National Museum of the Royal New Zealand Navy

Robert Chapman to observe that 'security slid like a girder beneath them.'[31]

The Labour leaders were less attached to the Empire, putting faith in the League of Nations, and were jaundiced about the role of a military force in New Zealand. While initially sceptical of the League of Nations, they soon realised that it gave New Zealand a voice in the international community and a platform to promote its views on security.[32] As the League failed to deal with the Italian invasion of Abyssinia and Japanese aggression in Manchuria, New Zealand adopted a more assertive stance compared to Britain's alleged "appeasement".

Labour's antipathy to military power did not apply to the new doctrine of air power. An air force was a modern, technological way of defending New Zealand without the need for an army or navy. An aerial component of the New Zealand Army had been established in 1924, but the new government wanted to establish the force on a sound footing. At the recommendation of Wing Commander Ralph Cochrane, the Air Force Act was passed in 1937, providing for an independent Royal New Zealand Air Force (RNZAF).

At the outbreak of the Second World War, New Zealand had what was in effect a moribund army significantly under-strength, and under-equipped. Our naval strategy depended on a significant but incomplete base in Singapore, 4,500 nm away, and a small force of ships to be controlled by the Royal Navy in times of war. In contrast, the fledgling RNZAF was initiating the training of air and ground crews and building bases.

The Second World War

New Zealand's participation in WWII was unhesitating and enthusiastic. The unity of the Empire was reaffirmed when the Prime Minister told the nation,

> *...we range ourselves without fear beside Britain... we are one and all a band of brothers and we march forward with union of hearts and wills to a common destiny.*[33]

Some 7,000 New Zealanders served with the Royal Navy in all capacities, and in all theatres, at one point making up 10% of the Royal Navy's Fleet Air Arm.[34]

31 Chapman, *From Labour to National* in W.H. Oliver and B.R. Williams (eds) *The Oxford History of New Zealand*, 338.
32 Hensley, 25.
33 Savage, Rt. Hon. Michael Joseph, 5 Sep. 1939.
34 Report of the New Zealand Naval Board for the Period *1 April 1945 to 31 March 1946*, 15.

HMS *Achilles* crew member arriving at Auckland | Ron Pemberton

New Zealand's naval forces were in action in December 1939, when the New Zealand Division's cruiser HMS *Achilles* was attached to Force G,[35] hunting the German heavy cruiser *Admiral Graf Spee*. *Admiral Graf Spee* was severely damaged in the Battle of the River Plate and subsequently scuttled by her commander. HMS *Leander* escorted the New Zealand Division's troop convoy to Egypt, and was attached to the East Indies Station at Aden, sinking the Italian raider *Ramb I* while there.

Activities of German commerce raiders in the southern Pacific Ocean and Tasman Sea caused grave concern to the New Zealand Government, which made repeated requests to return HMS *Leander* to New Zealand waters. The Admiralty had higher priorities for her, sending the armed merchant cruiser HMS *Hector* briefly to New Zealand, and eventually agreed that HMS *Leander* would return to New Zealand at the end of 1942.

Another *Leander*-class cruiser, HMS *Neptune* joined the New Zealand Division in May 1940 and was offered to New Zealand as a replacement for HMS *Leander*. While en route to New Zealand, HMS *Neptune* was attached to the 7th Cruiser Squadron in the Mediterranean, participating in several actions. On December 19, she strayed into an enemy minefield and sank, after hitting a mine, with only one survivor. The loss of 150 sailors was New Zealand's single largest naval loss.

Domestically, the sea war was not going well. In March 1940, the German commerce raider *Orion* laid minefields off New Zealand, one sinking the liner RMS *Niagara.* In August, *Orion* attacked and sank the trans-Tasman trader *Turakina. Orion* then teamed up with *Komet* and searched the New Zealand and Panama shipping lanes for targets, but they were unsuccessful, presumably, because the sinking of RMS *Niagara* and the *Turakina* had warned authorities of the raiders' presence. The coastal trader *Holmwood* was attacked and sunk between the Chatham Islands and Lyttelton, and the liner MS *Rangitane* was sunk off the East Cape. The raiders called at the Kermadec Islands to plan future operations. *Orion* returned to Germany, but *Komet* returned to New Zealand waters with the captured Norwegian whaling ship *Adjutant*[36] and laid mines off Wellington and Lyttelton.

Four ships sunk as a result of raider activity would seem to be a small return for the effort involved. However, laying mines off the major ports effectively closed those ports until the minefields were cleared. The sinking of the *Turakina* and MS *Rangitane* also meant ships were not allowed to sail until the whereabouts of the raiders was known. More importantly, the raiders were able to operate over extensive areas of New Zealand waters with little or no interference. Although HMS *Achilles* was in New Zealand at the time, she was always 'in exactly the wrong place' when raider reports were received and frequently only arrived in time to pick up survivors – hence the government's keenness for HMS *Leander* to return to New Zealand waters.

In October 1941, the New Zealand Government reformed the New Zealand Division of the Royal Navy as the Royal New Zealand Navy (RNZN) with its own command structure. This was largely an administrative change, as the ships remained under Admiralty control for the duration of the war, and New Zealand still met the costs. But the change gave New Zealanders a greater sense of "ownership" of their navy.

It is unclear why the government did this in the middle of a war that was not going well. At the time, New Zealand had difficulty in getting "its" cruisers back to New Zealand; there was a need to raise local forces to combat enemy minefields and the real likelihood of a Japanese invasion. Despite Prime Minister Fraser's very good relations with Churchill, he was frequently at odds with the British Government over issues such as withdrawing the New Zealand Expeditionary Force from Africa for defence closer to home. It is possible the move was to emphasise that New Zealand was an equal partner in the war strategically, if not numerically.[37]

A fleet of smaller vessels was variously commandeered and built to clear the mines laid by the raiders, a task that kept the RNZN occupied for the remainder of the war. The minesweeper HMNZS *Puriri* was sunk by a

35 Force G was a task force comprising HM Ships *Exeter, Ajax, and Achilles.*

36 Captured in the South Atlantic by the raider *Pinguin*.

37 See for example, Margaret Clark (ed), *Peter Fraser: Master Politician*, 145-168. Dunmore Press, Palmerston North, 1998.

New Zealand's security, prosperity and well-being have always depended on a friendly maritime power to maintain order at sea.

mine laid by *Orion* nearly a year after it had been laid. In addition, the passenger liner HMNZS *Monowai* was requisitioned and converted into an armed merchant cruiser.

New Zealand and Australia were reliant on the British defence of Singapore to prevent aggression from Japan threatening either country. However, the British fleet could take anything up to three months, and the Singapore garrison would be expected to hold until it arrived.[38] This weakness became painfully evident in December 1941. Japan attacked the US Pacific Fleet in Pearl Harbour, swept through South East Asia, sinking HM Ships *Prince of Wales* and *Repulse,* the cruisers HMAS *Perth,* HM Ships *Cornwall, Dorsetshire, Vampire,* and *Exeter,* and the carrier HMS *Hermes.* It also forced the western powers (Britain, US, France, and the Netherlands) out of South East Asia. New Zealand's strategy of relying on the seapower of the Empire for its own defence, and supplementing Empire efforts in other theatres, was shown to be not just ineffective, but also dangerously naive.

Over the previous 40 years, the government of New Zealand had spent considerable sums of money supporting the Royal Navy, including the cost of the Singapore defences. It encouraged its own people to join the British (or Empire) services in the belief that Britain would come to its aid, if required. What was not envisaged by New Zealand decision-makers was that Britain would be too heavily involved in its own defence to assist its dominions. Australia had taken a somewhat more realistic view of the situation and had built up a fleet of its own, and when Japan threatened Australia, Canberra brought Australian soldiers home from North Africa.

The imperative to seek more self-sufficient defence arrangements was not just a military one. At the outbreak of the war, Britain offered to purchase New Zealand's entire annual agricultural output at very good prices. While this provided funds to equip the New Zealand Division, the goods had to get to Britain. Ships had to be found to carry them, and all cargo ships were at least initially prioritised for the carriage of the New Zealand Division and its reinforcements to the Middle East. By the end of 1940, a third of the ships available to carry New Zealand cargo had been sunk, forcing Britain to conserve shipping by sourcing meat and butter as much as possible from Canada and the US [39] with less reliance on New Zealand's exports. The entry of the US into the war presented a different problem when the necessity to supply the US military in the Pacific raised concern that New Zealand could not meet the demand.

With the US now participating in the war, General Douglas McArthur, US Army, became Supreme Commander in the Pacific, and New Zealand forces were incorporated into his command for the remainder of the war. The New Zealand ships came under the command of a US admiral in command of the combined Anzac fleet. From then on, the RNZN did most of its fighting in the Pacific. HMNZ Ships *Achilles* and *Leander* both participated in the Guadalcanal battles. Other ships in the Pacific were minesweepers of about 600 tons, including HMNZ Ships *Tui, Moa,* and *Kiwi*. HMNZS *Kiwi* detected and successfully attacked, by depth charges, guns and eventually ramming, the Japanese submarine *I-1* off the Solomon Islands in 1943.

In order to allay New Zealand's concerns about its own security and forestall the withdrawal of the New Zealand Division from North Africa, the US stationed the 1st Marine Division in Wellington and Auckland to prepare for the Pacific campaign.[40] Over the course of the war, more than 100,000 Americans were based in New Zealand. The impact was significant. At the time, a large proportion of New Zealand's young men were overseas, and large numbers of Americans made a favourable impact on public opinion. For example, numbers peaked at around 50,000, when the population of Wellington at the time was less than 350,000.[41]

38 Wigmore, *The Japanese Thrust*, 6.

39 Hensley, 138.

40 "205 – The Secretary of State for Dominion Affairs to the Prime Minister of New Zealand".

41 Section IV.–Population, *New Zealand Official Yearbook*.

If familiarity breeds contempt, it also removes ignorance. The loss of confidence in imperial security was accelerated by a shift of markets from Britain to North America, command structures where British commanders were subordinate to American commanders, and finally, exposure to large numbers of ordinary Americans in the form of soldiers specifically sent here to provide security that the British could not. If, prior to the Second World War, New Zealand was Anglophile, or 'seeking favoured-child status',[42] by 1943, that was strained. Furthermore, in a few years the Empire itself began to dissolve.

The end of the war brought a period of re-identification both for New Zealand and its military. The RNZN had to create its own identity independent of the Royal Navy and find its role in a world where the strategic outlook was changed. New Zealand contributed to Commonwealth forces in Japan and Korea within Commonwealth and United Nations command structures. Allied planning for conflict with the Communist Bloc called for New Zealand to despatch an infantry brigade to the Middle East, escorted by New Zealand cruisers, which would then undertake maritime operations in the Australia, New Zealand, Malaya[43] region. Over time New Zealand's focus shifted away from Britain to became more aligned to Australia and the US.

Conclusion

New Zealand's modest size and oceanic position have, throughout history, dictated the nature of its strategic problems and their solutions. New Zealand's security, prosperity and well-being have always depended on a friendly maritime power to maintain order at sea. So, New Zealand's strategy has been a simple one: to align to more powerful states and maintain those relationships. The development of the NZDF in general, and the RNZN in particular, reflects that reality. In colonial times, security was provided by alignment with the Royal Navy, and after WWII it was provided by the US Navy, augmented by the Royal Australian Navy, as signalled in the Australia, New Zealand, and United States Security Treaty.

After 1986 and the US ostracism of the NZDF because of New Zealand's nuclear-free policy, there were hopes among Labour Party leaders that collective security could be provided by the United Nations Security Council (UNSC). The challenge New Zealand faces now is that the UNSC, because of ideological polarisation and vetoes by Russia and China, is not a reliable provider of maritime security. New Zealand's imperative is to align itself with the global power most likely to secure New Zealand's maritime interests, which now is clearly the US.[44] But to make a credible claim on the collective maritime defence effort, New Zealand must demonstrate its willingness to contribute to that effort by credible self-defence. Maintaining the capacity of the NZDF and the RNZN will strengthen that claim and ensure that New Zealand retains membership in all important defence arrangements of the 21st century.

References

"205 — The Secretary of State for Dominion Affairs to the Prime Minister of New Zealand." 1942. *Documents Relating to New Zealand's Participation in the Second World War 1939–45*, Vol. 3. Wellington: Victoria University of Wellington, 1942. http://nzetc.victoria.ac.nz/tm/scholarly/tei-WH2-3Doc-c7-22.html

"Agreement as to Additional Force to be Employed for the Protection of the Floating Trade in Australasian Waters." Multilateral treaty, May 6, 1887. *Proceedings of the Colonial Conference 1887*, Vol. 1, 507. Her Majesty's Stationery Office.

Australian and New Zealand Naval Defence Act 1903. Article II of Schedule.

Belich, James. *I Shall Not Die: Titokowaru's War 1868–1869*. Wellington: Allen & Unwin, 1989.

Bentley, Geoffrey. *RNZAF: A Short History*. Wellington: A.H. and A.W. Reed, 1969.

Chapman, Robert. "From Labour to National." In *The Oxford History of New Zealand*, edited by W.H. Oliver and B.R. Williams. Wellington: Oxford University Press, 1981.

42 Belich, 112.

43 A joint planning arrangement covering the Eastern Indian Ocean, Malaya, and Thailand for the protection of wartime sea communications.

44 On the nuclear-free dispute that began in 1964 and how it was resolved in 2016, see Stephen Hoadley, *New Zealand United States Relations*, Wellington: New Zealand Institute of International Affairs, 2016, particularly chapters 4 and 5.

Clark, Margaret, ed. *Peter Fraser: Master Politician*. Palmerston North: Dunmore Press, 1998.

Harper, Glyn. *Massacre at Passchendaele*. Auckland: HarperCollins Publishers, 2000.

Hensley, Gerald. *Beyond the Battlefield, New Zealand and its Allies 1939–1945*. Auckland: Penguin Group, 2009.

Howard, Grant. *Portrait of the Royal New Zealand Navy: A Fiftieth Anniversary Celebration*. Wellington: Grantham House Publishing, 1991.

Howard, Grant. *The Navy in New Zealand. An Illustrated History*. Wellington: Reed Publishers, 1981.

Jellicoe, Admiral. *Report of Admiral of the Fleet Viscount Jellicoe of Scapa, G.C.B, O.M., G.C.V.O., Naval Mission to the Dominion of New Zealand 1919*. Wellington: New Zealand Government, 1919.

Loughnan, Robert A. *The Remarkable Life Story of Sir Joseph Ward: 40 Years a Liberal.* Wellington: New Century Press, 1929.

Manatū Taonga – Ministry for Culture and Heritage. German auxillary cruiser SMS *Wolf*. https://nzhistory.govt.nz/media/photo/german-cruiser-sms-wolf

Marlborough Express. "Naval Defence." August 29, 1913. Papers Past.

Massie, Robert K. *Dreadnought: Britain, Germany, and the Coming of the Great War*. London: Vintage Books, 2007.

Report for the Air Department 1937–1938. Presented to Parliament 1938.

Statistics New Zealand. *New Zealand Official Yearbook 1940*.

Statistics New Zealand. *The New Zealand Official Year Book 1939*. http://www3.stats.govt.nz/New_Zealand_Official_Yearbooks/1939/NZOYB_1939.html

Statistics New Zealand. "Consolidated Fund – Revenue, 1901–2 to 1910–11." In *The New Zealand Official Year Book, 1911*.

Steff, Reuben. "The Biden Administration and New Zealand's Strategic Options: Asymmetric Hedging, Tight Five Eyes Alignment, and Armed Neutrality." *National Security Journal* 3, no. 2 (2021): 10. https://doi.org/10.36878/nsj20210317.02

Titchener, Paul. *The Von Luckner Incident*. Auckland: Lodestar Press, 1978.

Wigmore, Lionel. *The Japanese Thrust*. 1st ed. *Australia in the War of 1939–1945. Series 1 – Army*, Vol. 4. Canberra: Australian War Memorial, 1957.

LIEUTENANT COMMANDER RICHARD DAVIES, RNZN

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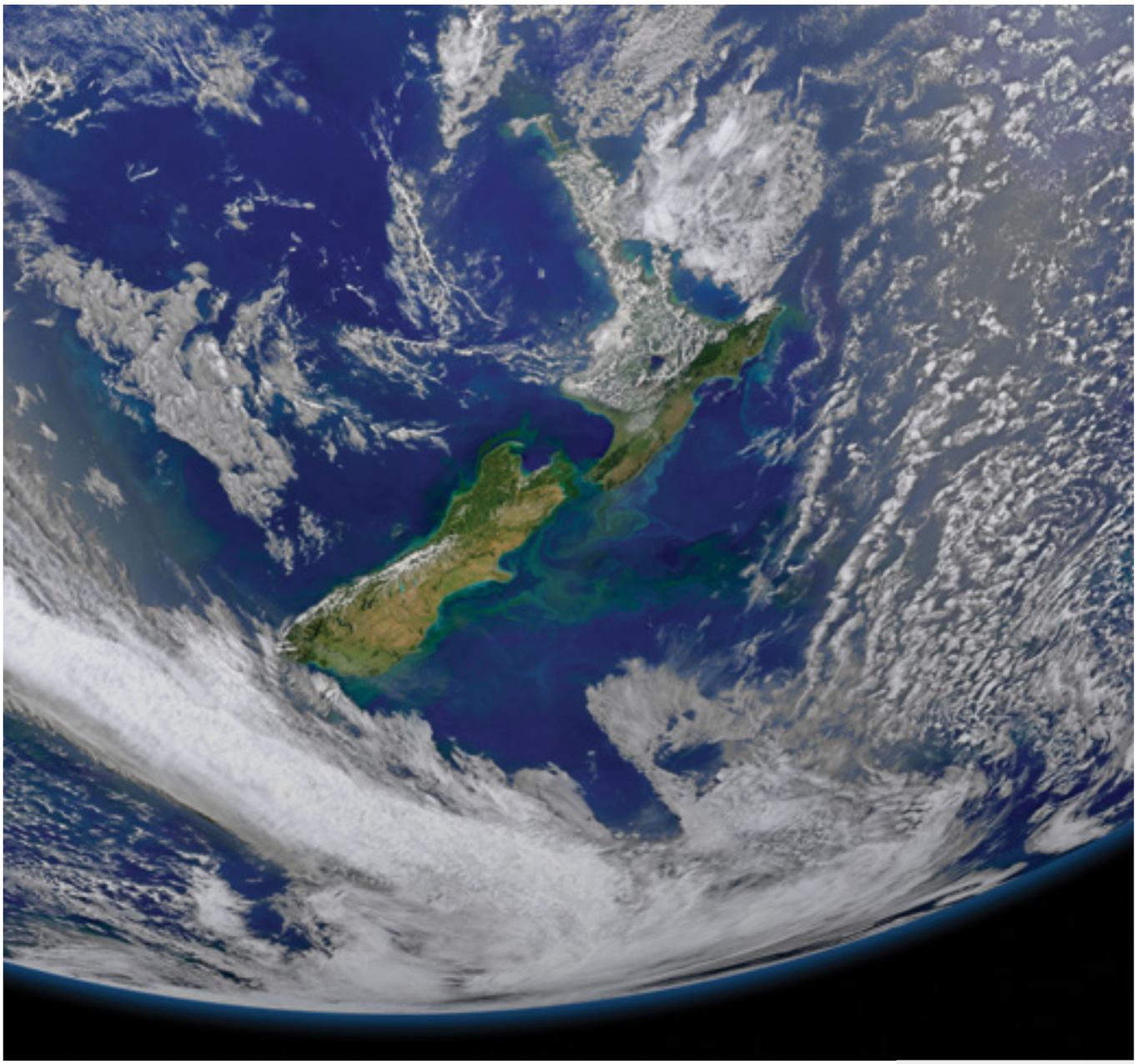

New Zealand from Space, 9 January 2015 | NASA Goddard

THE INFLUENCE OF GEOGRAPHY ON NEW ZEALAND'S STRATEGY

Captain John Sellwood, RNZN

Understanding New Zealand's geography is fundamental to understanding New Zealand's strategy, argues Captain John Sellwood, RNZN. But, avoiding simple reductionism, the author notes the importance of historical relationships, trade, technology, military preparedness, and international institutions for the security and prosperity of island nations such as New Zealand. Small but adaptable states can build on geographic opportunities and transcend geographic liabilities by nurturing partnerships with like-minded states, and by supporting international arrangements that foster stability. Sellwood notes that 'New Zealand's strategic approach features strong security partnerships, flexible expeditionary forces, and a willingness to back principles with concerted action'. He concludes that, on balance, New Zealand has adapted to its unique geography successfully.

Introduction

This essay attempts to provide insights into the impact New Zealand's geography has on our strategic approach. To start, I will offer my observations on how we might think about New Zealand's geography. Secondly, I will delineate the fundamental components of New Zealand's strategic approach. To do so will require generalising in a way that telescopes the healthy diversity of views on our history. Finally, I will try to synthesise the parts into a coherent whole and suggest conclusions about strategy for island nations in general and New Zealand in particular.

Before I proceed, I think it is worth recapping the ideas contained in my 2022 article in this Journal.[1] The argument I put forward was that strategy is shaped by geography in two important ways: any given territory will have an inherent ability to develop national power; and there are freedoms and constraints imposed on strategic interaction by spatial configuration. Geography is only one influence on strategy, and its qualities are not completely static, but it is, figuratively, the stage upon which strategic actors tread. A failure to understand geographic realities risks pursuing doomed strategies.

New Zealand's geography

The most salient aspects of New Zealand's geography are:

- remoteness from other landmasses;
- temperate climate; and
- topographic variety.

These three factors, separately and in combination, are fundamental to thinking about our strategic approach.

Remoteness

New Zealand's remoteness from other landmasses is where we must begin. No other land mass of a comparable size is so far from its neighbours as New Zealand is. Additionally, it is important to note that we are not only remote but also at the very end of the natural routes of human dispersal from ancestral homelands. As a result, New Zealand was essentially the last habitable part of the globe to be permanently settled.

New Zealand's remoteness belies the fact that the islands themselves are part of a much larger submerged continental rock. The terrestrial component of this mini-continent (dubbed Zealandia) is six per cent of its total area. Geological processes gradually shaped this former province of Gondwana, pushing up mountain ranges and wearing them back down, twisting and melding the rock, leaving at times only small portions above the level of the ancient seas. In the deep span of time, New Zealand is a liminal presence, growing and shrinking while drifting away from its sister continents.

1 Sellwood, "The Influence of Geography on Great Power Competition".

Topographic map of Zealandia, based on bathymetry data from Scripps Institution of Oceanography, University of California, San Diego | Wikimedia

Climate

The islands the Polynesian navigators discovered were at a substantially higher latitude than any of the other island groups in the South Pacific, with a temperate rather than tropical climate. Located in the band where tropical and polar air masses meet, New Zealand is regularly swept by frontal systems and sub-tropical depressions, ensuring that fresh water is abundant. Wet climates provide an ideal environment for the growth of forests, which in turn support a high biomass. When combined with our long isolation from other landmasses, this gives New Zealand richly unique flora and fauna that has evolved free from the influence of humans and other terrestrial mammals.

As Australian scientist Tim Flannery points out, the consequence of the arrival of humans in previously uninhabited islands is a process of adaptation by the natural environment to a new apex species.

Aotearoa was arguably still in the middle of this process when the speed of adaptation was thrown into overdrive by the arrival of Europeans with their crops, livestock, and technology. This acceleration was partly the result of the similarity of New Zealand's climate to that of Northwestern Europe, the obverse of the difficulties Māori experienced with the tropical agricultural complex they had brought with them.

Varied topography

New Zealand owes its existence to its location on a tectonic plate boundary. Without the seismic and volcanic forces released by the collision of plates, the rock

that makes up New Zealand would be an unremarkable continental shelf. Instead, our islands host snow-topped mountains, volcanic cones, glacier-carved fjords, wide alluvial plains, and beach-strewn coasts. The price of this variety is that the process is never over; tectonic disruption is an unavoidable reality of life in New Zealand.

The scale of the major topographic features combine with regular rainfall to produce perennial rivers that tumble down from the high interior over relatively short distances. The consequence of this is that very few rivers are navigable beyond their lowest reaches, eliminating the chance of easily servicing inland regions with water transport. In modern times, these same rivers have been a boon to the production of hydro-electricity but an obstacle to a transportation network that is already constrained by mountainous topography.

Continuities of strategy

I will work from the premise that while there has not been a single unifying New Zealand strategy, we can nonetheless observe a degree of strategic continuity. At the very least, patterns of thought and action can become self-reinforcing to the point of having strategic impact. For the purposes of this essay, I contend that these continuities comprise New Zealand's strategic approach.

Settlers

The first fact to note is that our remoteness acts as a filter on the peoples who could viably settle here. Overcoming the challenge of oceanic distances to establish a permanent presence in New Zealand favoured those who were both skilled mariners and motivated to settle new land.

The Polynesian navigators were the greatest oceanic voyagers of their age; the British had attained that status by the late 18th century; both exhibited a robust desire to settle widely. Once New Zealand's remoteness had been mitigated by improving maritime knowledge and technology, its combination of size, topography, and climate were an inducement to settlement.

Despite the apotheosis of maritime skill and technology required to get here, the motivation for doing so was more parochial than mercantile. A by-product of our location relative to the populous parts of the world is that Aotearoa was not positioned to be an entrepôt for trade. New Zealand is effectively at the end of long sea lines of communication rather than in the centre of the kinds of dense maritime networks that characterise regions such as the Mediterranean, North West Europe, the Caribbean, or South East Asia. The contrast between colonial New Zealand's economy and the development of British trading posts in Singapore and Hong Kong illustrates this difference.

Colonial economics

The immediate result of colonisation was the beginning of extractive industry, closely followed by the development of export-oriented agriculture. Before the signing of Te Tiriti o Waitangi, not only were timber, flax, seal skins, and whale oil being harvested but also crops were leaving New Zealand shores for markets around the Pacific. By the late 19th century, refrigerated shipping, improved livestock, hybridised grass varieties, and phosphate fertilisers had begun to unlock the economic potential of extensive farming. From this era, New Zealand came to enjoy a standard of living that was on average among the highest in the world.

The eminent New Zealand economics professor Dr Gary Hawke has argued that after the rapid economic gains of the colonial era, the overriding national goal was the maintenance of living standards (at least on a relative basis).[2] His contention is that after moving rapidly to the top of per-capita economic leaderboards, our challenge was naturally one of holding our place rather than overtaking others. For the majority of the 20th century, maintaining that position included nurturing industries that would otherwise struggle as a result of the small scale of the New Zealand domestic market. The deindustrialisation crisis that swept the western world in the 1970s and 1980s put paid to that approach, leading eventually to the shuttering of major manufacturing plants such as car factories. This reinforced the criticality of sea-borne imports for our economic well-being as overseas manufactured goods substituted for much that had formerly been New Zealand made.

2 Hawke, "Ideas and Policy".

New Zealand's strategic approach has therefore always depended on our maritime links to the rest of the world. Increasingly reliable and cost-effective shipping is one of the most consequential developments of the modern world, the result of both technological progress and of a more orderly maritime commons. Our early experience of this was in the era when British naval dominance deterred threats to shipping. The two world wars saw temporary reversals of that norm but the general principle remained the same: we benefit from the fact that the preeminent maritime powers have sought to make global trade more predictable.

The international system

It is natural for a nation heavily oriented towards trade to care about whether the international system promotes stability and economic growth. In the colonial and dominion eras, the international system as viewed from New Zealand was heavily influenced by our place in the British Empire. The Second World War irrevocably changed that outlook, substituting international institutions and newly independent nations for the centrality of empires, with the United States economically, militarily, and diplomatically in the vanguard. The great advantage of the post-Second World War order for New Zealand was that it gave small nations greater opportunities to shape international rules and norms.

Influencing the international system requires the use of all the tools of statecraft. The effort New Zealand governments have applied to this task has often been weighted toward the use of diplomacy to promote trade. But it would be a mistake to underestimate the value of deploying military forces to bolster security and order. The focus of our efforts to support a stable and predictable international system is conditioned by both our geography and our history. It is natural, for example, that we should have strong links to our neighbours, principally Australia and the Pacific islands. But it is also natural to retain links based on shared history with nations on the other side of the globe. Most importantly, our deep dependence on a world that respects sovereign equality leads to a principled aversion to aggression and revanchism, and a willingness to back our principles with action.

Island nation strategies

With the example of New Zealand in mind, what can we say about generic island nation strategies? Fundamentally, to prosper on an island, inhabitants must balance two factors: the benefits of having a natural moat to isolate you and the degree to which your own resources must be supplemented from outside. The United Kingdom and Japan, as they

1940 Centennial of New Zealand 6d stamp showing the SS *Dunedin* | Copyright Tūhura Otago Museum, Dunedin

USS *Charleston* (LCS 18) sails with HMNZ Ships *Aotearoa* (A11) and *Te Kaha* (F77), by Lauren Chatmas | DVIDS

were in 1840 (both of similar size in land area to New Zealand), provide contrasting examples of this strategic choice. The UK had, by then, translated domestic industry into a globe-spanning maritime trade and military network, while populous Japan remained strategically insular until the Meiji Restoration in 1868.

In the modern world, having a moat has retained utility for defence, but it is no longer a guarantee of security. Projecting power over the seas in order to seize and hold territory is among the most complicated military operations, but it is still an option for major powers. However, the primal fear of naval invasion has for many nations been supplanted by the spectre of war waged at long range with nuclear armed ballistic missiles. For island nations of modest resources, there is a balance to be struck between, on the one hand, rigorously guarding the moat, and on the other, concentrating excessively on the state of superpower rivalries.

Once an island nation has resolved to rely on the outside world, its moat becomes a superhighway. For the ships that must traverse the oceanic highways, the threat is greatest where sea lines of communication intersect with zones of contested control. Maritime powers have thus always paid intense interest to straits and chokepoints (the Strait of Hormuz, the Bab Al Mandab Strait, and the Malacca Strait are current examples of concern), islands commanding maritime approaches, and natural harbours on hostile coasts. The development of the British Empire owes much to this vein of thought, as does modern American strategy.

In an interdependent and hyperconnected world, island nations will therefore need a view of maritime security that is effectively global in scope. For all but the most powerful states, comprehensive maritime security implies working with partners (there are no walls to shelter behind at sea, after all), which entails reciprocity. Being able to contribute elsewhere (possibly at great range if you live in the far corner of the map) becomes a strategic necessity if island nations want to reap the full benefits of an orderly maritime commons. Applying these insights to New Zealand, the value of our Navy becomes evident.

Conclusion

This essay argues that New Zealand's geography has an important effect on our strategic approach. The remote oceanic location, temperate climate, and diverse landforms mean that this land was well-situated to become an agricultural powerhouse, but could do so only in conjunction with sea-borne trade and a well-functioning international order. This has profound implications for our military, especially our Navy. New Zealand's strategic approach features strong security partnerships, flexible expeditionary forces, and a willingness to back principles with concerted action. Each of these features is firmly grounded on New Zealand's geography.

In conclusion, geography may be largely static, but the fate of nations is anything but. No matter how clear geography's effect on strategy appears to be, there is scope for adaptations that transcend the limitations imposed by geography. New Zealand as a nation state is an example of adaptation to island geography, as evidenced by its relatively high standard of living and status among the family of nations.

References

Hawke, Gary R. "Ideas and Policy: The Power of History. New Zealand's Growth Potential in Historical Perspective." Presentation for Treasury Academic Linkages Programme, School of Economics & Finance, Victoria University of Wellington, October 15, 2002. https://www.treasury.govt.nz/sites/default/files/2007-09/tgls-hawke.pdf

Sellwood, John. "The Influence of Geography on Great Power Competition." *Professional Journal of the Royal New Zealand Navy* 3, no. 1 (2022): 36–45.

CAPTAIN JOHN SELLWOOD, RNZN

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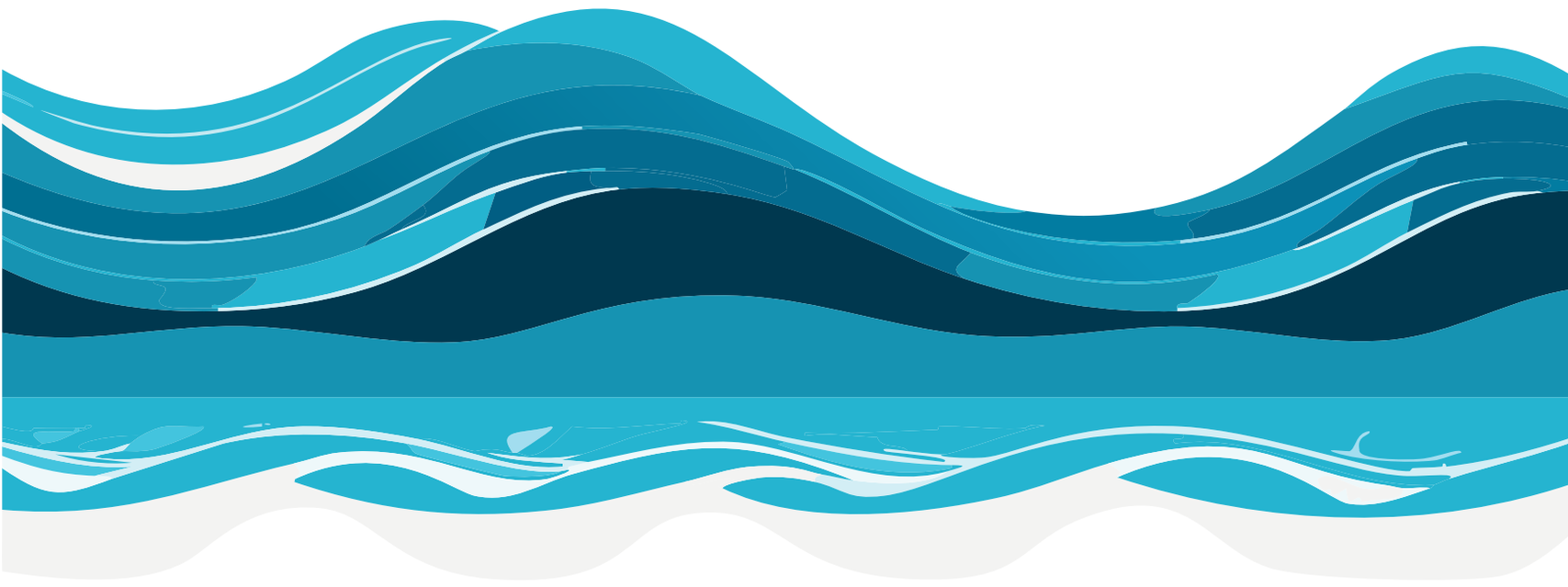
Above: Sailors from class BCT 23/01 graduate at Devonport Naval Base | NZDF
Below: Joint Terminal Attack Controllers (JTACs) Bombardier Jackson Lawrence (centre left) and Bombardier Matt Freegard (centre right) alongside JTAC and Ground Forward Air Controllers (GFAC) from the UK and Malaysia watch a Republic of Singapore Air Force F-15 conduct a simulated Close Air Support mission in the Tioman Island group, Malaysia during Exercise Bersama Shield 2024| Dept of Defense Australia

PART 2:
STRENGTHENING THE PRESENT



CLIMATE CHANGE AND CHINA: CHALLENGES TO THE NZDF

Warrant Officer Wayne Mitchell

Damage from Cyclone Gabrielle, February 2023 | NZDF

In an analysis that parallels those of Captain Andrew Watts, ONZM, RNZNR, and Mr Michael Vredenburg in this volume, Warrant Officer Wayne Mitchell identifies two threats emerging in the Pacific island region likely to challenge the NZDF in the coming decade. He argues that both threats – climate change and the rise of China – will erode the international rules-based order that underpins New Zealand's security, trade and prosperity. Mitchell asserts that a capable, deployable NZDF is necessary to achieve the Government's stated aims and national interests. However, he warns, 'Government has yet to provide the necessary resources for new weapons, platforms, logistics, or sufficient pay to retain critical skills' and therefore 'the gap between the combat mission aims of the NZDF and its capacity to carry out those missions will widen'. If this issue is not remedied, Mitchell concludes, New Zealand's value as a reliable security partner will decline.

The two security issues of concern in this essay are the damaging effects of climate change and the increasingly assertive military behaviour of China. Both contribute to the erosion of the international rules-based order. Although New Zealand has until now benefitted from a relatively benign Pacific regional environment, the commentaries provided in recent Defence strategic policy documents released by the New Zealand Ministry of Defence (MoD)[1] suggest that the threat from climate change and an increasingly contested geopolitical environment regarding China over the next decade will increasingly impact negatively on the security of New Zealand and its interests. These documents show that the growing threat from climate change and the challenge of China raise the salience of the NZDF. This requires that the public of New Zealand change their current world view from one of assuming peace and stability to one of awareness of threats and their consequences.

The New Zealand Government has been explicit in acknowledging that the security and prosperity of New Zealand are at risk from climate change and the increased assertiveness of China in the Indo-Pacific region,[2] therefore New Zealand must be ready to deal with both.[3] This essay will review each in turn, then discuss their implications for the NZDF.

The challenge of climate change[4]

Pacific island nations, including New Zealand, are the first in the world to be experiencing the full impacts of climate change, which could displace more than 1.7 million people by 2050.[5] While there are still many people who deny climate change,[6] there is irrefutable evidence that climate change is real and will affect a large part of the world's population in some form over the coming years. The current pace of sea level rise has not been seen for 5,000 years and threatens low-lying island nations with flooding, coastal erosion and storm surges.[7] In 2022, a total of 35 natural hazard events were reported in the South-West Pacific, of which over 70% were flood events. These resulted in over 700 fatalities, of which over 70% were associated with storms.[8] The increasing frequency and severity of extreme weather events is putting at least 50,000 Pacific island residents in danger

1 New Zealand Ministry of Defence, *Defence Policy and Strategy Statement and Future Force Design Principles*.

2 New Zealand Government, *Aotearoa's National Security Strategy*.
3 Fifield, "A Gloomy Outlook", 6-9.
4 This challenge was also recognised by a previous Chief of Navy, Rear Admiral John Martin, RNZNR. See his "New Zealand's Ocean Estate: A Case for a Greater Role in Addressing Climate Change", in Volume 3 of this Journal (July 2021, 142-150).
5 McCarthy, "Pacific Island Nations Declare Climate Crisis, Ask for Support".
6 Bretter & Shulz, "Why Focusing on 'Climate Change Denial' is Counterproductive".
7 Parsons, *The Pacific Islands*.
8 World Meteorological Organisation, *State of the Climate in the South-West Pacific*.

of losing their homes each year.[9] Those returning home are more likely to face instability in the form of land and maritime disputes as the competition for dwindling resources intensifies. This instability is likely not only to cause harm to people, especially women and children, but also to stoke conflict.[10]

Consequently, it is important that New Zealand, as a good neighbour and citizen of the Pacific, supports partner Pacific nations' efforts to develop resilience and enhance capacity. In support of international action on climate change, New Zealand has committed $1.3 billion in climate finance for 2022–2025[11] to support efforts to reduce greenhouse gas emissions and adapt to the impacts of climate change. Another way in which the government of New Zealand provides support is through its many bilateral partnerships and participation in groups such as the Pacific Islands Forum. The Pacific Islands Forum supports Pacific island nations by fostering cooperation between governments, collaborating with international agencies, and representing the interests of its members.[12] The Forum's 2018 Boe Declaration[13] recognised climate change as the single greatest threat to the security and wellbeing of the peoples of the Pacific islands.

Given the increased number of weather-related disaster events in the South-West Pacific, it is no surprise that the NZDF's responses to such events have also increased, both in New Zealand and the wider Pacific region. The NZDF has responded in some form to every major natural disaster to hit the region over the past 10 years by undertaking tasks from strategic airdrops of aid to provision of water-making facilities and re-building of schools. What has become evident is that no one climate disaster is the same, requiring the NZDF to remain agile and flexible in its thinking and future capability development. Therefore, for the NZDF to be able to provide relief, it will need to partner with other Pacific island and Pacific rim nations. The NZDF will continue to be required to contribute to an all-of-government effort in response to climate disasters. To that end there will be a requirement for the next iteration of the *Defence Capability Plan*[14] to consider the most suitable assets to enable more effective delivery of military effect for humanitarian assistance and disaster relief missions. However, there is also a need to ensure that alongside the *Defence Capability Plan*, and in line with *the Defence Policy and Strategy Statement 2023*, the NZDF analyses and considers impacts on Pacific regional security and stability.

The challenge of China[15]

Since the end of the Second World War, the strategic environment has been relatively benign. It has been stabilised by an international rules-based system that has benefitted much of the world.[16] Research has shown trends toward fewer and less lethal wars over time.[17] After 1991 and the fall of the Soviet Union, a unipolar world order evolved in which the United States provided stability through its "benign hegemony". However, this has created a mindset of almost naivety in the populations of the world, who for the most part see the globe as a peaceful and cooperative place.

But this is no longer the case. The rise in power and influence of China in the Pacific region is resulting in a change in the geopolitical environment that is likely to undermine the current international rules-based order. China is increasingly using a range of economic and non-economic tools to influence, deter and punish rival governments. Actions such as "no strings attached" debt financing[18] have become a key part of China's toolkit as it takes a more assertive position in international disputes and seeks to reshape the global order in its favour.[19] These initiatives are enhancing

9 Internal Displacement Monitoring Centre, *Pacific Response to Disaster Displacement*.
10 Rajaratnam School of International Studies, *Women, Peace and Security in the Asia-Pacific*.
11 New Zealand Ministry of Foreign Affairs and Trade, "What is Climate Finance?".
12 "Who We Are". Pacific Islands Forum.
13 *Boe Declaration on Regional Security*.
14 New Zealand Ministry of Defence, *Defence Capability Plan*.
15 The China challenge was addressed also in this *Journal* in 2022 by Commodore Garin Golding. See his "The Rise of China: Security Implications for the Polar Regions", *Professional Journal of the Royal New Zealand Navy*, 3, no. 1 (October 2022), 86-107.
16 New Zealand Ministry of Defence, *He Moana Pukepuke e Ekengia e te Waka*.
17 "Is the World Getting More Peaceful?".
18 Zhang, "China's role in the Pacific islands region".
19 Hunter, et al. *Countering China's Coercive Diplomacy*.

Navy and Army personnel pass fuel cans across flood damaged routes near Dartmoor, Hawke's Bay | NZDF

China's influence, shaping international approaches, challenging existing international rules and norms, and promoting China's leadership in these areas.[20] President Xi Jinping has a vision of reshaping the world according to China's rules.[21] In a speech to Asia-Pacific Economic Cooperation (APEC) business leaders in November 2022, President Xi proposed building an "Asia-Pacific community with a shared future".[22] Whilst there are a number of Pacific island nations that have accepted Chinese assistance, the mantra of a shared community is now seen as a tactic, whereby President Xi is using China's influence to change the narrative and legitimise his coercive diplomacy.

For New Zealand, the prospect of a shift from a rules-based order to power competition is challenging. As a relatively small country, New Zealand has benefited significantly from the certainty and stability of the rules-based international system. New Zealand has enjoyed remarkable successes in shaping, supporting and implementing international rules and norms in areas important to its interests, including in international trade, oceans and Antarctic management, and arms control.[23] To cite just one example, the prosperity of New Zealand requires free and unfettered access to the global maritime commons,[24] making the safety and security of world-wide sea lines of communication a vital national interest. The Houthi attacks on ships passing in the Red Sea, for example, threatens this interest.

20 New Zealand Ministry for Foreign Affairs and Trade, *Navigating a Shifting World*.
21 Zhang, *Decoding Xi Jinping's "Asia Pacific Community With a Shared Future"*.
22 Xinhua, "Xi's speech at 29th APEC Economic Leaders' Meeting.
23 New Zealand Ministry for Foreign Affairs and Trade, *Navigating a Shifting World*.
24 Royal New Zealand Navy Directorate of Seapower and Warfare, *New Zealand Defence Force - Maritime Doctrine*.

Chinese Luyang II-class destroyer | US Navy

NZDF response

A conflict in the Pacific region will require investment in the NZDF to enable the translation of New Zealand's *National Security Strategy*[25] into NZDF capacity and operational capability. The recently released *Defence Policy and Strategy Statement*[26] states that the NZDF is to pursue four key interests on behalf of the New Zealand Government. These are:

1. a secure, sovereign, and resilient New Zealand;
2. a secure, stable, and resilient region;
3. collective security through a strong network of partners; and
4. a strong and effective international rules-based system.

In order to protect New Zealand's interests, the NZDF must continue to engage with partners and enhance relationships in the Pacific region through exercises and operations alongside the security forces of the Pacific island states. An example is Operation Calypso, whereby a RNZN ship was deployed to Samoa in support of specialist training of the Samoan Police Maritime Unit to receive a patrol boat from Australia.[27] Operations such as these enhance New Zealand's reputation as a security partner of choice in the Pacific.

Within the next decade the NZDF will likely be required to participate in conflict and security operations in the Pacific region. In order to be prepared, the mindset of the government, the NZDF, and the public must change from reaction to proactive deterrence. However, over the last 10 years most of the current members of the NZDF have only engaged in response operations. Most operations that have been undertaken (except for combat training missions to Iraq and the United Kingdom) have been in response to large-scale weather-related events and natural disasters in New Zealand and the Pacific. So most personnel of the NZDF do not see themselves in a profession of arms, only as a constabulary.[28] Granted, the *Defence Strategic Policy 2023* does mandate enhanced lethal combat capability in all services as a fundamental aim, looking towards the Defence Capability Plan delivering the necessary resources for new weapons and platforms, logistics capability, or sufficient pay to retain critical skills.

Conclusion

One hopes that the future will look like the past: a NZDF presence in the Pacific region working closely with partner nations to build capacity and resilience. This is commendable insofar as it prepares partner forces to operate together seamlessly in the event of state-on-state conflict. By doing this the NZDF ensures that it has influence in, and situational awareness of, the future battlespace, including the ability to operate with its partners. But as challenges intensify, the gap between the combat mission aims of the NZDF and its capacity to carry out those missions will widen, lowering New Zealand's status in the eyes of its partners. As a nation, and as a defence force, we must prepare better to meet the challenges that are looming.

25 New Zealand Department of Prime Minister and Cabinet, *National Security Strategy 2023-2028*.
26 New Zealand Ministry of Defence, *Defence Policy and Strategy Statement*.
27 New Zealand Defence Force, "On Patrol in Samoa".
28 New Zealand Defence Force, *Army 25 - Chief of Army's Brief*.

References

Boe Declaration on Regional Security. n.d. Pacific Islands Forum: https://www.forumsec.org/2018/09/05/boe-declaration-on-regional-security/

Bretter, C., and F. Shulz. "Why Focusing on 'Climate Change Denial' Is Counterproductive." *Proceedings of the National Academy of Sciences*, March 1, 2023. https://www.pnas.org/doi/10.1073/pnas.2217716120

Fifield, A. "A Gloomy Outlook." *New Zealand International Review* 48, no. 4 (July/August 2023): 6–9.

Hunter, F., D. Impiombato, Y. Lau, D. Triggs, A. Zhang, and U. Deb. *Countering China's Coercive Diplomacy*. The Australian Strategic Policy Institute Limited, 2023. https://ad-aspi.s3.ap-southeast-2.amazonaws.com/2023-02/Countering%20Chinas%20coercive%20diplomacy_1.pdf?VersionId=HZDwezgnFY5eitQqtEMEU7WuFci8S75z

Internal Displacement Monitoring Centre. *Pacific Response to Disaster Displacement*. n.d. https://www.internal-displacement.org/sites/default/files/brochure_prdd_final_260520_min_v2.pdf

"Is the World Getting More Peaceful?" *One Earth Future*, April 7, 2021. https://oneearthfuture.org/en/one-earth-future/news/world-getting-more-peaceful#:~:text=The%20short%20answer%20to%20this,dramatically%20since%20the%20%20late%201940s.

Kristine, L. "The UN Is Trusted More Than Any Other Governmental Organization, Global Survey Finds." *Global Citizen*, December 1, 2020. https://www.globalcitizen.org/en/content/united-nations-trust-global-survey/

"Main Bodies." United Nations. n.d. https://www.un.org/en/about-us/main-bodies

McCarthy, J. "Pacific Island Nations Declare Climate Crisis, Ask For Support." *Global Citizen*, August 2, 2019. https://www.globalcitizen.org/en/content/pacific-island-nations-climate-crisis/

New Zealand Defence Force. "Fiji Joins the Effort to Support Cyclone Gabrielle Response." *New Zealand Defence Force*, February 28, 2023. https://www.nzdf.mil.nz/media-centre/news/fiji-joins-the-effort-to-support-cyclone-gabrielle-response/

New Zealand Defence Force. "On Patrol in Samoa." *Navy Today*, no. 278 (July 2023). https://issuu.com/nzdefenceforce/docs/navytoday_issue278/s/27899721

New Zealand Defence Force. *Army 25 - Chief of Army's Brief*. n.d. https://www.nzdf.mil.nz/assets/Uploads/DocumentLibrary/Army-2025-booklet-spread-v2.pdf

New Zealand Government. *Aotearoa's National Security Strategy: Secure Together Tō Tātou Korowai Manaaki*. National Security Group, August 2023. https://www.dpmc.govt.nz/publications/aotearoas-national-security-strategy-secure-together-tatou-korowai-manaaki

New Zealand Ministry for Foreign Affairs and Trade. *Navigating a Shifting World.* Strategic Foreign Policy Assessment. June 2023. https://www.mfat.govt.nz/assets/About-us-Corporate/MFAT-strategies-and-frameworks/MFATs-2023-Strategic-Foreign-Policy-Assessment-Navigating-a-shifting-world-June-2023.pdf

New Zealand Ministry of Defence. *Defence Capability Plan*. Wellington: New Zealand Ministry of Defence, June 2019. https://www.defence.govt.nz/publications/defence-capability-plan-2019/

New Zealand Ministry of Defence. *He Moana Pukepuke e Ekengia e te Waka – Defence Assessment 2021*. Wellington: New Zealand Ministry of Defence, 2021.

New Zealand Ministry of Defence. *Defence Policy and Strategy Statement*. New Zealand, August 2023. https://www.defence.govt.nz/assets/publications/23-0195-Defence-Policy-and-Strategy-Statement-WEB.pdf

New Zealand Ministry of Defence. *Future Force Design Principles*. August 2023. https://www.defence.govt.nz/assets/publications/23-0195-Future-Force-Design-Principles-WEB.pdf

New Zealand Ministry of Foreign Affairs and Trade. "What Is Climate Finance?" https://www.mfat.govt.nz/en/aid-and-development/climate-change-support/what-is-climate-finance/

Parsons, C. "The Pacific Islands: The Front Line in the Battle Against Climate Change." *National Science Foundation*, May 23, 2022. https://new.nsf.gov/science-matters/pacific-islands-front-line-battle-against-climate#:~:text=Over%20the%20coming%20decades%2C%20climate,of%20climate%20change%20head%20on

Rajaratnam School of International Studies (RSIS). *Women, Peace and Security in the Asia-Pacific*. Singapore: RSIS Centre for NTS Studies, December 1, 2015.

Royal New Zealand Navy Directorate of Seapower and Warfare. *New Zealand Defence Force - Maritime Doctrine*. Wellington, 2018.

"Unipolar World." Unacademy. n.d. https://unacademy.com/content/cbse-class-12/study-material/political-science/unipolar-world/

"Who We Are." Pacific Islands Forum. n.d. https://www.forumsec.org/who-we-arepacific-islands-forum/

World Meteorological Organisation. *State of the Climate in the South-West Pacific*. Geneva: World Meteorological Organisation, 2022. https://reliefweb.int/attachments/d3ff147e-cec9-4361-a69c-ec6df15e3c99/1324_State_of_the_Climate_S-W_Pacific_en.pdf

"Xi's Speech at 29th APEC Economic Leaders' Meeting." *Xinhua Net*, November 18, 2022. https://english.news.cn/20221118/7db869e27bdf41b2bc619b84f3b7a5da/c.html

Zhang, J. "China's Role in the Pacific Islands Region." In *Regionalism, Security & Cooperation in Oceania*, edited by R. Azizian, R. Herr, M. Powles, E. Y. Shibuya, J. Hayward-Jones, A. Powles, and C. Cramer, 43–56. Honolulu: Daniel K. Inouye Asia-Pacific Center for Security Studies, June 2015. https://dkiapcss.edu/wp-content/uploads/2015/08/Regionalism-Security-Cooperation-Oceania.pdf

Zhang, M. Y. "Decoding Xi Jinping's 'Asia Pacific Community With a Shared Future.'" *The Diplomat*, December 9, 2022. https://thediplomat.com/2022/12/decoding-xi-jinpings-asia-pacific-community-with-a-shared-future/

WARRANT OFFICER WAYNE MITCHELL

Warrant Officer Wayne Mitchell began his RNZN career in 1996. He has served in diverse posts in New Zealand, at sea and abroad. These included postings to HMNZ Ships *Kahu*, *Manawanui*, *Te Kaha*, *Te Mana*, *Wellington* and *Canterbury*. He has completed operational deployments to the Solomon Islands and the Middle East, as well as humanitarian assistance and disaster relief (HADR) missions to Fiji and Vanuatu. In 2017 Mitchell graduated from the US Navy Senior Enlisted Academy in Rhode Island, and was not long after posted to Washington D.C. as the first NZDF Executive Chef to the New Zealand Ambassador to the United States. Upon returning to New Zealand he was assigned to the RNZN's Leadership Development Group as a senior leadership development instructor. In 2023 Mitchell earned a Bachelor of Applied Management in business information systems, and also attended the Joint Warrant Officer Advanced Course of the NZDF Command and Staff College. He is currently serving in the Joint Logistics Branch at Headquarters Joint Forces New Zealand. He aspires to become a NZDF strategic warrant officer and mentor to the next generation of soldiers, sailors, and aviators.

TWO SECURITY THREAT SCENARIOS AND PROPOSED RNZN RESPONSES

Captain Andrew Watts, ONZM, RNZNR

Bridge scene in HMNZS *Te Mana* June 2022 during *Te Mana*'s transit from Canada to New Zealand | NZDF

Scenarios can help to visualise future contingencies, indicate appropriate responses, and guide strategic planning. In this article, Captain Andrew Watts, ONZM, RNZNR, sketches two scenarios that plausibly depict the intervention of a continental power in the Pacific region. This allows him to offer hypothetical prescriptions regarding preferred responses by the RNZN and by New Zealand's partner militaries. Captain Watts's overriding theme is deterrence, which entails the capability to deploy forces to reinforce the international rules-based order. He concludes with observations on RNZN capacity shortfalls and warns that the Navy is approaching a "capability break-point".

The importance of deterrence

For the past 20 years or so, the main threat to peace and the international rule of law has come from ideologically driven terror groups and international criminal networks. The impact of both of these on fragile systems of governance in the developing world has been profound. These threats are not going away, and defence policy and investment must continue to take them into account. However, as highlighted in the *Defence Assessment 2021*,[1] the spectre of inter-state conflict has again reared its ugly head.

In this article, I will attempt to show ways in which our Navy might have to respond to future crises while the world tries to deal with this new reality. In order to do this, I have drawn two scenarios: one based on the deterrence of inter-state conflict, and one based on a direct threat to the resources of one of our Pacific partners.

Inter-state wars usually have deep and complex roots in ideology, nationalism and grievance. However, they begin when a nation or power bloc's leadership calculates, or miscalculates, that the advantages to be gained from armed aggression outweigh the costs and risks involved. Perhaps we see that most clearly in Putin's deeply tragic invasion of Ukraine. Putin and his "yes-people" seem to have calculated that NATO and liberal democracies generally were too spineless to do anything to stop them. They have discovered, to their immense cost, that this is not the case. As usual, the price of their malice and stupidity has been paid by innocent people. My two scenarios aim to show how we can raise the costs and risks to potential aggressors and thus deter them.

Scenario 1 – Defending the international rule of law

In my first scenario, I posit that a like-minded group of states with which New Zealand has long standing ties is faced with both state-based aggression and non-state and criminal threats, together with a humanitarian crisis in the Pacific region. I have tried to illustrate how various states, including New Zealand, might contribute to the campaign of deterrence, including the types of capability that might be brought to bear and how these might be integrated in a complementary whole.[2]

Picture a populous and developing archipelagic nation, which I will call "Islandia", that has long been wracked by internal divisions. Conflict on religious and ethnic lines is endemic, and there have been several serious armed uprisings against the internationally recognised and democratically elected central government. Regions dominated by ethnic and religious minorities have become almost ungovernable, and international criminal gangs have exploited this to run drugs, weapons, and people smuggling operations, which have further de-stabilised systems of governance and increased human suffering. The country as a whole is vulnerable to natural disasters, particularly tropical cyclones. In an attempt to improve its economic situation, the elected government has entered into dialogue with a powerful regional state that I will call "Continentia", which routinely flouts international norms in pursuit of regional dominance. It is offering large loans and military basing rights are under consideration,

1 New Zealand Ministry of Defence, *Defence Assessment 2021 Cabinet Paper*.

2 Watts, "Designing the Next Fleet".

Hydrographers from HMNZS *Matatua* conduct surveys during Exercise Tropic Twilight in Niue in 2022 | NZDF

together with agreements to "share" the exploitation of marine resources, including fish stocks and seabed minerals. Negotiations are complicated by Continentia's claims to sovereignty over parts of the affected country, based on an imperial occupation that ended centuries ago. The dialogue between Islandia and Continentia breaks down. The latter's demands prove too much for the government of Islandia because agreement would risk ceding aspects of sovereignty and resource control in perpetuity.

Then, a severe tropical cyclone strikes the south of Islandia. This is the region where religious and ethnic conflict is at its most severe and where governance has broken down almost entirely, except within a short radius of the regional capital. On the pretext of delivering aid and providing protection to an ethnic minority originating from its own lands (albeit centuries before), Continentia sends a powerful expeditionary force centred on amphibious shipping, surface combatants, and a substantial ground force to the affected region. Submarines are likely to be operating in support. A lodgement is made despite the protests of the legitimate Islandia government. The operation at first focuses on disaster relief. However, a construction battalion soon arrives and begins creating what seem to be permanent basing fixtures, including runways, port facilities, and headquarters buildings. Continentia quickly expands its lodgement into Islandia's hinterland, driving out legitimate law enforcement agencies and armed forces units. Continentia announces that it will remain in Islandia for as long as it takes to provide humanitarian assistance and protect its minority.

The government of Islandia then announces on the world stage that the forces of Continentia are unwelcome, and that they are refusing to withdraw despite repeated demands to do so. Islandia issues a request for assistance, which is taken up by a large bloc of democratic countries in the United Nations, partly out of concern for the precedent that would be set should the occupation be tolerated. However, a permanent member of the UN Security

HMNZS *Te Kaha* departs Auckland for exercises (2024) | NZDF

Council vetoes a resolution calling on Continentia to withdraw.

Three members of a regional dialogue group eventually decide that the situation is intolerable, and that they must act. While all three states are internally cohesive and economically strong, all have territorial disputes of one kind or another with Continentia. All three governments are concerned that if the regional power is allowed to prevail in this situation, they could be the next targets of its aggression.

A coalition is formed

Building on the request for support from the government of Islandia, the three states form a coalition with the stated aim of obliging the regional power to withdraw and restoring lawful national governance over the affected region, while providing humanitarian support to the affected population. A range of economic and diplomatic measures are proposed, together with a military operation to isolate Continentia's lodgement so that it becomes logistically unsustainable. The primary aim is to provide humanitarian assistance without provoking direct conflict. A secondary aim is to disrupt the increasing flow of weapons, drugs, and people organised by criminal gangs.

The United States, Australia, the Republic of Korea, and other regional states quickly join the coalition. Following the recent passage of legislation amending its constitution to permit participation in such operations, Japan follows suit, followed by India. After debate in Parliament, the New Zealand Government also commits to the coalition. Eventually, coalition membership includes 14 states, including the United Kingdom and other European powers, providing logistical, intelligence, and diplomatic support. The US is asked by the three founding states of the coalition to provide the operational framework, to which it agrees.

A Combined Joint Task Force (CJTF) is formed with a US commander and a deputy commander from one of the three original states. Other coalition officers are allocated senior command roles in the JTF. The CJTF HQ is established at Headquarters US Indo-Pacific Command (INDOPACOM) in Hawaii. Planning conferences are held at INDOPACOM, and the basic plan of a campaign to meet the threat takes shape. The following is agreed:

- The end state will be attained when:
  - ◊ Continentia withdraws its forces from the affected country;
  - ◊ the immediate causes of human suffering in the affected region have been relieved; and
  - ◊ conditions for the resumption of lawful governance, and any follow on humanitarian assistance operations that may be agreed to, have been established, subject to the continued approval of the legitimate government.
- The coalition will be ready to provide humanitarian assistance as soon as conditions permit, noting that such operations will have to be carried out under threat of attack from Continentia, terrorists, and criminal networks.
- All operations will be in accordance with the strictest possible interpretations of international law, in particular, the United Nations Convention on the Law of the Sea (UNCLOS) and the Law of Armed Conflict (LOAC).
- Bearing in mind the formidable naval capabilities of Continentia, a covering force[3] will be created to maintain sea control in the approaches to the affected region and to interdict re-supply of Continentia's lodgement force. This force will consist of multi-function combatants including cruisers, destroyers, and frigates equipped with the Aegis air defence system, high endurance uncrewed surface and sub-surface vehicles, submarines, and aircraft carrier- and land-based air power.
  - ◊ In addition to establishing sea control and interdicting regional power re-supply shipping, the covering force will build maritime domain awareness (MDA) in the approaches to the affected region.
  - ◊ The covering force will be distributed over a wide area but will be subdivided into surface action groups (SAG), each commanded by an officer from one of the countries contributing to the covering force.
- A forward force[4] to operate in the littorals of the region will be created. It will operate under the protective umbrella of the covering force, and its mission will include the interdiction of Continentia re-supply shipping which might evade the covering force, denying the littorals to Continentia, and interdicting seaborne criminal activity including the inflow and outflow of drugs, weapons, and people. It will also support the building of MDA in the littorals and provide sufficient sea control to allow the amphibious force (see below) freedom of manoeuvre. It will also provide intelligence, surveillance, and reconnaissance (ISR) and fire support to any coalition amphibious lodgement.
  - ◊ The forward force will contain expeditionary reconnaissance elements able to gather information about possible amphibious lodgement sites (see below).
  - ◊ It will also support special forces operating covertly in the affected region.
- An amphibious force will be established based on land forces embarked in coalition amphibious shipping. The Commander, Amphibious Task Force (CATF) and the Commander, Landing Force (CLF) will be provided by the US Navy and US Marine Corps respectively. Other coalition land forces will be embarked in national amphibious shipping.
  - ◊ The amphibious force will be provided with protection against symmetrical and asymmetrical threats and will operate at the direction of the CJTF to shape the operational environment. For example, it may be held in an area

3 The terms "covering force" and "forward force" are drawn from Rear Admiral J.R. Hill, *Maritime Strategy for Medium Powers*, US Naval Institute Press, Annapolis, MD 21402, United States, 1986. The thinking in this book was updated in Richard Hill, "Medium Power Strategy Re-visited", RAN Sea Power Centre Working Paper, 3, March 2000. I recommend both as guides to ways in which nations like ours can acquire and employ sea power in support of national aims.

4 Ibid.

remote from the area of operations to create ambiguity about the way in which it might be used, or it may be brought forward to create a direct threat to the flanks of the lodgement.

◊ The amphibious force will be configured for humanitarian assistance as well as combat operations.

- A replenishment force will be established from which the covering, forward, and amphibious forces can replenish as required.
  - ◊ It will operate under the protection of carrier- and shore-based aircraft and the area defence capabilities of the covering force.
- An ISR force will be established consisting of crewed and autonomous aircraft and space assets tasked by the CJTF to build situational awareness and support the covering, forward, amphibious, and replenishment forces as required.
  - ◊ All forces will contribute to the common operational picture, including aircraft and autonomous vehicles organic to surface forces, but the ISR force will consist of scarce, valuable, and strategic assets capable of wide area coverage and requiring centralised management and tasking.

New Zealand's options

Given the way in which the coalition force has been designed and the ways in which its elements will be employed, the following options exist:

- **Contribute to the covering force**:
  - ◊ The post-Frigate Systems Upgrade Anzac class frigates could, under some circumstances, be assigned to the covering force. Their ISR capabilities would contribute to MDA, and they are capable of meaningful self defence against the anti-ship missile threat and contributing to the defence of the SAG to which they are assigned. In addition, they are able to share information with other parts of the force via interoperable data links, and their presence in the covering force complicates the regional power's surveillance and targeting problem by increasing the number of ships that the regional power would have to detect, classify, and track. However, they lack the magazine depth required against a sustained, high volume anti-ship missile attack, their ability to contribute to anti-surface operations is limited to the Penguin missile carried by the SH-2G(I) helicopter, which is out-ranged by adversary missiles and of which only one at a time can be carried by the helicopter, and their anti-submarine capabilities are limited to basic self-defence. In the event of an escalation in hostilities, this would require them to operate under the protective umbrella of other forces, restricting manoeuvre options and creating a potential burden on the covering force.
- **Contribute to the forward force***:*
  - ◊ In this role, the post-FSU Anzac class frigates are effective. Their comprehensive ISR and helicopter capabilities would support MDA, their relatively shallow draft would allow operations reasonably close inshore, their well-trained boarding parties would support interdiction operations, and their armament (including the embarked helicopter) would be effective against the littoral surface threat. They would also be able to provide fire support and even a degree of local air defence to forces operating ashore. Critically, their assignment to the forward force could free up a more capable combatant for assignment to the covering force.
  - ◊ Should threat levels fall to a level where the threat is posed largely by criminal groups, an offshore patrol vessel (OPV) might replace or supplement a frigate in the covering force.
- **Contribute to the amphibious force:**
  - ◊ A company group embarked in HMNZS *Canterbury,* with its vehicles and equipment, could be assigned to the amphibious force. Expeditionary reconnaissance elements from HMNZS *Matataua* could also be embarked, together with NH90 helicopters to support the company group.
  - ◊ A frigate could be assigned to provide protection to the amphibious force. Their local area air defence and anti-surface capability would be useful in this role.
- **Contribute to the replenishment force**:
  - ◊ HMNZS *Aotearoa* would be a very welcome contribution to the replenishment group given the paucity of regional replenishment shipping and

the need to keep the covering, forward, and amphibious forces on station for protracted periods.

◊ A frigate could be assigned to provide protection to the replenishment force, as above for the amphibious force.

- **Contribute to the ISR force***:*
  - ◊ P-8A Poseidon aircraft would be a highly capable, highly valued, and fully interoperable contribution to the ISR force.

Discussion of Scenario 1

The options above provide a menu from which the New Zealand Government could select according to its appetite to engage, the risks that it is prepared to accept, and concurrent defence commitments. However, those advising the Government should take into account the relative value our partners are likely to place on combat and non-combat contributions, regardless of the apparent value of the latter. Our partners will value combat capability more highly, despite what their spokespeople might say in public. We need to consider the dubious morality of leaving the fighting to others when fighting becomes unavoidable, when in the final analysis our vital interests are just as much at stake as theirs.

Faced with the evident resolve of the coalition and the forces arrayed against it, Continentia realises that it has miscalculated.[5] In secret negotiations in a neutral country, a face-saving formula is arrived at which allows Continentia to withdraw its forces on the grounds that its humanitarian mission has been achieved, and that it will be replaced by an international force that will continue its work while protecting Continentia's ethnic minority. However, it does not resile from its historical sovereignty claim or its right to protect its ethnic minority, leaving the door open for similar action in future.

5 This optimistic outcome is postulated purely as a closure point for this scenario. Other outcomes are conceivable but beyond the scope of this essay.

A column of warships during Exercise Rim of the Pacific in 2020 | DVIDS

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Following withdrawal of the regional power's lodgement force, the multi-national force is reconstituted. The covering force remains as an ongoing deterrent, albeit at much reduced strength. The amphibious force including embarked land force elements is re-tasked for humanitarian assistance and disaster relief (HADR), with part of the land force tasked with force protection. The number of combatants in the forward force is reduced and some are replaced by patrol vessels in view of the reduced threat following the regional power's withdrawal, and it continues to interdict criminal traffic in drugs, arms, and people. The replenishment force is reduced in proportion to the reduction of the covering and forward forces but remains critical to the operation. The ISR force is disbanded, with ISR support being provided by separately tasked national assets.

The above scenario attempts to describe ways in which New Zealand might contribute to a multi-national operation in which vital humanitarian and rule of law principles are at stake. It also attempts to show ways in which elements of our current force structure might integrate with those of our partners. Leaving aside the capability sustainment challenges which have been extensively covered elsewhere,[6] and assuming the validity of the above scenario is accepted, it can be seen that current capability does in fact provide a reasonable range of options for the types of contribution that the New Zealand Government might wish to make – with some deficiencies:

- The most serious deficiency is that the availability of an Anzac class frigate is likely to be highly problematic, given that there are only two units in the naval combat force. Aside from readiness challenges brought about by maintenance and training requirements, we know from operational research that a viable naval combat workforce cannot be maintained with only two ships.

6 Saxby, "Preparing to Sustain a Modern Frigate-based Fleet".

- *Canterbury* has exceeded expectations in her service to date. However, her lack of a well dock means that she can only conduct landing craft ship-shore operations in benign conditions. Even in the normally calm South-West Pacific, her operations can be severely constrained by the long, low swell that predominates. This seriously limits her ability to support the amphibious scheme of manoeuvre. In addition, as the only amphibious ship in the fleet she may be unavailable for deployment due to maintenance or because the government directs that she must be available to deploy for disaster relief during the South Pacific cyclone season.

Scenario 2 – Defending Pacific EEZs

A Pacific island state for which New Zealand has external defence responsibility has declared an Exclusive Economic Zone (EEZ) in accordance with UNCLOS provisions. That hypothetical state, which I will call Pasifika, has a highly efficient police force equipped with a capable patrol craft provided by the Australian Government, but its resources are not equal to the task of building MDA over the EEZ, and the single patrol craft is the only reactive force available should an infringement be detected. New Zealand supports the Pacific state with MDA from strategic intelligence assets, P-8A patrols, and periodic OPV deployments.

A powerful extra-regional state I will call Continentia with a very large blue water fishing fleet has repeatedly challenged the rights of nations under UNCLOS to control EEZ resources. One of the species that its fishing fleet targets is found in abundance in the waters of the Pacific state. New Zealand strategic intelligence assets and P-8A patrols have detected repeated EEZ infringements by vessels targeting this species. By various means it has been determined that beneficial ownership of the infringing vessels is traceable back to the extra-regional state, and protests by Pasifika have accordingly been registered – but lack of on-station assets has prevented interdiction of vessels in the act of infringement.

Continentia at first ignores the protests, and its fishing vessels continue to infringe, steadily becoming bolder and operating deeper in the Pacific state's EEZ. Continentia then begins to take the line that UNCLOS is an out-of-date, colonial-era construct intended to serve the interests of the former imperial powers and their successors, including New Zealand.

Cued by New Zealand intelligence assets, Pasifika's patrol vessel intercepts an infringing vessel, and after a very professionally executed opposed boarding, arrests it and escorts it to the port of the capital. This triggers a series of aggressive protests by Continentia, accusing Pasifika of piracy and promising retaliation. A very large fleet of deep sea fishing vessels is mobilised and deployed to Pasifika's EEZ. Attempts by Pasifika's patrol craft to arrest offending vessels are blocked by the aggressive manoeuvring of the fishing fleet as a whole.

The world-wide community of liberal democracies takes the view that the actions of Continentia threaten the entire UNCLOS regime and the international rule of law itself, but a resolution calling on Continentia to respect UNCLOS is vetoed by one of the permanent members of the Security Council. Many nations offer support to New Zealand and to Pasifika, but none is able to offer immediate assistance in the form of ships and aircraft. New Zealand must respond alone, using its own resources.

Strategic intelligence assets and P-8A tasking priority shifts to building a picture of Pasifika's EEZ. The only immediately available naval asset, an OPV, is deployed to the Area of Operations, embarking a detachment of law enforcement officers from Pasifika. The OPV intercepts a group of Continentia's fishing vessels but is refused permission to conduct boardings. Evidence of illegal fishing activity is gathered and is subsequently used to draw attention to the actions of Continentia.

The Rules of Engagement of the OPV are liberalised to allow the firing of warning shots from the 25 mm main armament to induce the vessels to consent to being boarded. Warning shots are fired over the decks of three unlicensed vessels, which promptly cut their fishing gear and proceed out of the EEZ at their best speed. Within a very short space of time, Continentia denounces what it calls aggressive and provocative action on the part of New Zealand, and states that a naval task group will be deployed to protect the legitimate activity of its fishing fleet.

Navy shortfalls

At the time the OPV is deployed, one frigate is in deep maintenance, the other is working up in Australian exercise areas. The frigate being worked up is recalled at the same time as the OPV is deployed, to provide backup and a more capable response option. This frigate is now deployed to Pasifika's EEZ but having been withdrawn from work-up, it is at a low state of operational readiness with many capabilities, including boarding and anti-surface warfare, essentially unproven. The ship's company contains a high proportion of officers and ratings who have never before served in a frigate.

The frigate arrives on station at the same time as Continentia's task group, which consists of three combatants and a replenishment ship. A stand-off ensues, with neither side prepared to openly engage the other. Having been re-tasked from Southern Ocean re-supply deployment, HMNZS *Aotearoa* arrives on station just as the frigate reaches the minimum stability fuel state.

We can leave the scenario there. The outcome cannot be predicted, although it is likely that the stand-off will continue for weeks, if not months. Our ally, Australia, and our security partners may eventually come to our support with combatants to relieve some of the burden on our naval combat force but given our commitments to Pasifika we will be obliged to maintain a frigate on station as often and for as long as possible, or until Continentia's task group withdraws.

Our ability to respond to this scenario using our current resources is seriously constrained by the following:

- The availability of even one frigate in a state of acceptable readiness is problematic.
- It is more likely that an OPV[7] (or HMNZ Ships *Canterbury* or *Manawanui* acting as an OPV substitute) will be available. However, if an adversary decides to bring more sophisticated and/or combat capabilities to bear, the usefulness of the OPV is much reduced.

7 This article was drafted before the OPVs were placed in reduced availability due to personnel shortages. This point has been left in the article on the assumption (perhaps optimistic) that the state of the work force might again permit OPV operations.

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The likelihood of a confrontation over Pacific resources such as that depicted in the above scenario could be argued endlessly. Nonetheless, *Defence Assessment 21* appears to foreshadow that this is at least a possibility.

> *... Defence operations within New Zealand's immediate neighbourhood will increasingly require the use of more sophisticated military capabilities in support of regional partners, for example in greater maritime domain awareness or greater responsiveness to pressures on fishing resources...*[8]

Implications for New Zealand's naval force structure

The greatest single deficiency in our current force structure is that the naval combat force consists of only two frigates. In the first scenario hypothesised above, our government has a degree of discretion in the capabilities it chooses to deploy. However, our ability to make the type of contribution most relevant to the needs of the situation and most highly valued by our partners – naval combat capability – is seriously constrained by the limitations of our current force. In the second scenario above, our ability to respond to the escalatory actions of an extra-regional power in our region, and maintain an appropriate sustained combat capable presence, is similarly constrained.

Both scenarios could stalemate over months, if not years, requiring lengthy naval deployments. In the second scenario, deployments would be non-discretionary given our commitments to our Pacific partners (and our policy rhetoric). The implications of this for our naval workforce must be considered, and out-of-date assumptions about resilience margins, such as those that were imposed during the Defence Transformation Programme in the early 2010s, must be discarded. A defence workforce cannot be equated with a civilian workforce. The former is subject to pressures such as family separation and dangers not experienced by the latter,[9]

8 New Zealand Ministry of Defence, *Defence Assessment 2021*, 7.

9 Notable exceptions might be police and emergency services, but their personnel are seldom subjected to prolonged family separation.

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Our Navy is approaching the most significant capability break-point in its 80-year history.

particularly during extended operations such as those described above. A significant resilience margin must be available.

Our future force structure must provide greater naval combat availability, while meeting enduring requirements for constabulary type presence in support of our national defence needs and those of our Pacific partners. In the past, that would have meant more combatants and more patrol ships. However, emerging technology allows us to consider a fleet based on a common platform that can be switched between combat and patrol functions as required, greatly increasing the likelihood that combat capability would be available when needed and that sufficient coverage would be available for patrol functions. I do not for a minute underestimate the challenges involved in such an approach – a good many very serious issues would need to be considered, not least of which would be the human element. However, as I postulated in my 2020 article in this Journal,[10] it may be possible to adopt an HMNZS *Matataua* model for our combat/patrol fleet, whereby some people at least are coupled to a capability module as opposed to a ship, and deployed with that module. Engineers, logisticians, and mariners might still be linked to particular ships, but as suggested above, there would need to be a workforce margin that allowed the demands on them to be kept within acceptable limits.

10 For an expansion of this point see my 2020 article in this Journal, cited in Footnote 1.

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Conclusion

The above two scenarios, which distil my professional experience, lead me to a simple conclusion: our Navy is approaching the most significant capability break-point in its 80-year history. As naval professionals and people who care about defence, we have to do some serious thinking about what that means and what we can do about it.

References

Hill, Richard. "Middle Power Strategy Re-visited". Royal Australian Navy Sea Power Centre Working Paper 3 March 2000.

Saxby, Chris. "Preparing to Sustain a Modern Frigate-Based Fleet" in *Professional Journal of the Royal New Zealand Navy, 3*, no. 1, October 2002, 64–75.

Watts, Andrew. "Designing the Next Fleet" in *Professional Journal of the Royal New Zealand Navy, 1*, no. 1, December 2020, 22–47.

New Zealand Ministry of Defence. *Defence Assessment 2021 Cabinet Paper*. https://www.defence.govt.nz/publications/publication/defence-assessment-2021-cabinet-paper

New Zealand Ministry of Defence. *Defence Assessment 2021: He Moana Pukepuke e Ekengia e te Waka*. https://www.defence.govt.nz/publications/publication/defence-assessment-2021

CAPTAIN ANDREW WATTS, ONZM, RNZNR

Captain Andrew Watts, ONZM, RNZNR, joined the RNZN in 1980 as a midshipman. He qualified as Principal Warfare Officer in 1989, and subsequently commanded HMNZ Ships *Pukaki(II), Wellington, Resolution* and *Te Mana*. He retired from the RNZN in 2011 and worked for Opus International Consultants. He rejoined the RNZN in 2014 at the request of the then Chief of Navy to take up an appointment as Director, Operation Neptune, the Navy's programme of events to celebrate the 75th Anniversary of its founding in 1941. He also served as Captain Fleet Personnel and Training and as Course Sponsor for Junior Officer Common Training Course 19-1. His final posting was as Lead, Future Surface Combatant in Capability Branch, Headquarters NZDF. He transferred to the Naval Reserve in 2020, simultaneously taking up employment in the NZDF's Southern Ocean Patrol Vessel Integrated Project Team. He commends the high calibre of the officers, cadets, ratings and civilians he was privileged to lead and serve with and believes the RNZN could not be in better hands.

Sea ice, seen from HMNZS *Aotearoa*'s first supply mission to McMurdo, February 2022 | NZDF

A NEW "GREAT GAME" IN THE ANTARCTIC

Mr José Miguel Alonso-Trabanco

The inevitability of geopolitical rivalry and resource competition in the Antarctic is Mr José Miguel Alonso-Trabanco's theme. Already manifested by the establishment and expansion of research stations by China, the United States (US), and other governments, competition will intensify as a result of global warming, advances in technology, and rising prices of scarce resources potentially found in the continent and surrounding seas. To be able to moderate international rivalries and unrestrained resource exploitation, New Zealand should acquire military assets, develop diplomatic and other soft power tools, and negotiate partnerships with like-minded states. By promoting humanitarian and environmental values, New Zealand can raise its status and foster sustainable outcomes.

A stable strategic environment?

Throughout much of its history, New Zealand has benefited from a stable strategic environment. Its insular location in the South Pacific has shielded it from the threats of major geopolitical rivalries. For example, the recent shockwaves unleashed by both the Russian invasion of Ukraine, the outbreak of hostilities between Israel and the Middle Eastern "Axis of Resistance" headed by Tehran, and even China's garrisoning of artificial islets in the South China Sea do not appear to pose any direct existential threats to New Zealand's national security. Located in a peripheral position well beyond the "rimland" of the Eurasian landmass,[1] New Zealand, and the waterways on which it relies for its vital international economic exchanges, can be directly threatened only by great powers with blue-water navies.[2]

Considering this geopolitical profile and noting the natural limits of its national power, New Zealand has historically played a rather modest role in the arena of high politics. Nevertheless, the relatively benign conditions of the strategic environment under which it has flourished will not last forever. In fact, the foreseeable intensification of geopolitical competition for control of Antarctic resources will certainly alter this strategic environment negatively in the coming decades. This development presents risks for New Zealand's statecraft… but also opportunities.[3]

1 Spykman, *America's Strategy in World Politics*.

2 However, the attacks on shipping by Yemen's Houthis pose an indirect threat to New Zealand's economic well-being: the interdiction of choke points along New Zealand's commercial routes.

3 Editor's note: Readers will also wish to consult Commodore Garin Golding's 2022 analysis in this Journal. See his "The Rise of China: Security Implications for the Polar Regions", *Professional Journal of the Royal New Zealand Navy*, 3, no. 1 (October 2022), pp 86-107. Another key source is Anne-Marie Brady's *China as a Polar Great Power*, New York: Cambridge University Press, 2017. Up-to-date warnings are offered by the Australian Strategic Policy Institute.

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Geography and climate change

According to the teachings of Hans Morgenthau, an academic proponent of classical realism, geography is the single most important factor that shapes the national power of states.[4] This relevance is determined by the relative permanence of geographical features in time. Empires, kingdoms, and polities come and go, but oceans, rivers, mountains, jungles, and deserts remain far longer. However, creative national policies have the potential to mitigate unfavourable geographic circumstances, as Singapore and Israel exemplify. Nimble states can adapt policy to take advantage of shifting geographical conditions.

Specifically, climate change is one such shift, and it has been enabling a geopolitical race for the control of the resources of the circumpolar regions. These regions were usually regarded as frozen wastelands, where establishing a permanent human presence is exceedingly difficult. Deep tundra poses fierce challenges to human survival and to the logistics that are needed for even the most basic activities, let alone the development of profitable economic projects. But as these regions are expected to become incrementally warmer, major powers are moving into them to get ahead of their rivals. These lands offer significant strategic benefits in terms of abundant deposits of critical raw materials, new gateways for commercial navigation, and advantageous positions for electronic surveillance, military outposts, the deployment of warships, naval exercises and tests of innovative weaponry. Since 2007, Russia has sought to achieve dominance in the Arctic Ocean through its control of Siberia. In turn, China intends to gain a foothold in the far north through the development of the Polar Silk Road as a far-reaching project of economic statecraft. Likewise, under the Trump Administration,

4 Morgenthau, *Politics Among Nations*. See also the essay by John Sellwood in this volume.

the United States manifested its interest in the acquisition of Greenland as an instrumental asset in a coming age of "cryopolitics".

A new "great game" down south

This new version of the 19th century "Great Game" involves a rising competition for the control of Earth's last unclaimed territories. The spectrum of the resulting confrontational dynamics will not be confined to the Northern Hemisphere of the planet, but will extend to the frozen southern continent, Antarctica. As its ice sheets melt, Antarctica will become a contested geopolitical space. Several great powers will seek to establish a dominant position there. The unfolding drama will likely reprise elements from preceding historical eras such as the "Age of Discovery " and "The Age of Imperialism" in the heyday of classical mercantilism, and the Space Race in the second half of the 20th century. Variables such as unexplored or legally undefined frontiers, conquering fleets, competing geopolitical claims, technological innovations and mercantile interests will interact dynamically.

Specifically, the resulting improvement of weather conditions in Antarctica will facilitate the development of infrastructure, logistical chains and a permanent human presence in the coming decades. Since the early 1990s, Antarctica has lost approximately three trillion tons of ice, and the speed of the process is seemingly accelerating. Moreover, it is still unknown how far the extinction of its glaciers will go.[5] However, as perpetual winter in the far South recedes, the potential to perform various military, scientific and economic activities there will increase. Hence, with Christchurch as a gateway to the Antarctic, New Zealand is strategically positioned as a stepping stone for friendly partners to access the South Pole. Due to their closeness, other states with varying geopolitical orientations, such as Australia, Argentina, Chile, and South Africa, not to mention the US and European states and their rivals, will line up in the race to reach the world's ultimate geopolitical frontier.

So far, the Antarctic Treaty system, in which New Zealand is one of the original signatories, has survived as a multilateral framework to maintain a peaceful Antarctica. Yet, the survival of this regime is not the result of a shared commitment to written rules. Until now strategic competition in the wild south has been physically impractical because of weather and distance. However, the normative provisions of the Antarctic Treaty's legal framework will be undermined as climate warming makes increasingly feasible the occupation and control of portions of the Antarctic *Grossraum* and their natural resources. According to the *CIA World Factbook*, the territory of the frozen continent covers an area of 14.2 million km^2.[6] To put this expanse into perspective, it is comparable to that of the Russian Federation, the world's largest country, which extends over more than 17 million km^2.

Moreover, national boundaries are increasingly seen as no longer sacrosanct. In fact, they are increasingly being violated and redrawn as states win or lose territory militarily. Not surprisingly, territorial disputes are amongst the top drivers of conflict in some of the world's most contentious flash-points. The boundaries of the seven Antarctic claims were "frozen" by the Antarctic Treaty and are sure to be contested by states not recognising those claims. Resource-hungry states will be tempted by reportedly (but yet to be confirmed) vast deposits of oil, natural gas, strategic minerals, biodiverse fauna and flora, fisheries, and freshwater.[7] Their extraction is likely to be technically feasible and financially affordable in the near future, and resource-hungry governments will be positioning themselves to extract them.

There is already evidence of these initiatives. For example, as the world's leading sea power, the US, since the 1950s, has made its influence and presence visible by setting up research stations and assuming a leading role in Antarctic governance.[8]

Furthermore, China, a new great power whose current geopolitical thinking has begun to regard the southernmost continent as a "strategic frontier", has shown an intensifying engagement with the Antarctic through the deployment of icebreakers, fishing vessels, satellite

5 Stone, "Antarctica's Ice Could Cross This Scary Threshold Within 40 Years".

6 *CIA World Factbook*, "Antarctica".
7 Sheikh, Vaughn and Procita, *Antarctica*.
8 Dodds, "Antarctic Geopolitics".

ground stations, and five research units. Russia, too, has developed a network of dual-use infrastructure facilities in Antarctica, including terrestrial GLONASS ("Global Navigational Satellite System") stations and scientific research modules.[9] Moscow has developed both substantial material capabilities and world-class expertise as a result of its prior presence in the Arctic theatre.[10] Furthermore, Brazil, which is a core member of the BRICS[11] bloc with its own school of geopolitical thought, is considering the upgrading of its Antarctic programme, Programa Antártico Brasileiro (PROANTAR), in order to further its long-term strategic national interests in the Antarctic land mass and to increase its geopolitical influence there. This giant South American state contemplates scientific activities, a greater allocation of budgetary funds, and even power projection.[12] In late 2023, the United Kingdom (UK) and Chile, a Latin American country with historically close ties to the Anglosphere, formally agreed to develop closer co-operation in Antarctic affairs.[13] Besides New Zealand, Australia, and a dozen European and Latin American states, India, Japan, South Korea, and South Africa have become active on the continent. Today, up to 20 states are mobilising elements of their national power so that they can better manoeuvre for influence in Antarctica in future.

New Zealand's options

These developments present challenges for New Zealand's security strategy. New Zealand was an early Antarctic claimant, and maintains a presence in its Ross Dependency. Its Scott Base, a research facility operated by a state agency, Antarctica New Zealand, is a sign of Wellington's commitment to the continent. This entity's sphere of responsibility includes the management of the country's Antarctic policy, including environmental protection and scientific research. Yet, the scope of its strategic horizon is still limited. However, the aforementioned changing circumstances do provide opportunities that Wellington can exploit to enhance its projection of geopolitical influence in Antarctica. Although New Zealand is not a heavyweight, it can aspire through diplomacy to secure its seat at the tables at which consequential decisions are made, such as regulation of living and mineral resource exploitation.

New Zealand can respond to this challenge in four different ways:

- Firstly, a static risk-averse policy might be adopted due to a commitment to pacifism and a desire to stay away from the prospect of an eventual geopolitical collision. Yet, such a course of non-action could lead to disrespect and marginalisation of New Zealand's national interests.
- Secondly, Wellington could rely on a multilateral solution crafted through diplomatic efforts such as the revitalisation and international enforcement of the Antarctic Treaty. Yet, the effectiveness of this option is questionable among those who observe that, as recent invasions have illustrated, the "rules-based order" is weakening.[14] International institutions appear increasingly feeble in their ability to mitigate great power rivalries, and to threaten the security of small states.[15] In the ruthless and predatory arena of international politics, the strong usually do what they can and the weak have no choice but to suffer what they must, as the Athenian historian Thucydides concluded many centuries ago.[16]
- Thirdly, New Zealand can align itself with one of the competing blocs (through such coalitions as the Five Eyes, the Quad, Aukus or NATO) as a junior partner.[17] Nevertheless, this entails risks that go beyond the obvious costs of membership. Anchoring itself to a single geopolitical

9 Haward and McGee, "Antarctic Geopolitics".
10 Alonso-Trabanco, "La Misión Rusa Arktika 2007 y Sus Implicaciones Para el Balance Mundial de Poder en el Siglo XXI", 85-101.
11 The BRICS is an institutional organisation integrated by a myriad of heterogeneous states from the so-called "Global South". Its current members are Brazil, Russia, India, China, South Africa, Egypt, Ethiopia, Iran and the United Arab Emirates. Their common denominator is the pursuit of a multipolar world order.
12 Oliveira, *Brazil in Antarctica*.
13 Foreign, Commonwealth and Development Office, "UK-Chile Letter of Intent on Antarctic Co-operation 2023 to 2028".
14 Friedman, "The Myth of a Rules-Based World".
15 Mearsheimer, "The False Promise of International Institutions", 5-49.
16 Thucydides, "History of the Peloponnesian War/ Book 5".
17 Boulège, "Five Eyes Strategic Interests in Antarctica", 71-85.

coalition comes with the risk of New Zealand being dragged into a clash against a competing coalition of powerful states and becoming a target of potential enemies.

- Fourthly, New Zealand can perform the role of an assertive and independent state that moves at its own pace. New Zealand is a small nation that lacks an imperial tradition but, as the successful historical case of Portugal demonstrates, small maritime nations can aspire to greatness in their own right. New Zealand is already influential among the South Pacific island states.

Consequently, New Zealand needs a stronger presence in the Antarctic. Because exploration and resource extractive activities require autonomous expeditionary capabilities and hard power, protection of living and non-living Antarctic resources may present an incentive for New Zealand to enhance its military capabilities, especially sea and air power.

This challenge goes beyond simpler tasks like deterring illegal fishing, peacekeeping, disaster relief and limited deployments. Considering the power imbalances and the far-reaching significance of Antarctic geopolitics, New Zealand requires the allocation of budgetary resources and the reassessment of the country's strategic thinking to face the realities of a contested geopolitical domain. Furthermore, Wellington, with only modest military forces, will need to develop its unconventional vectors of power projection, non-kinetic force multipliers and asymmetric equalisers. This cannot be achieved overnight, but rather incrementally, given the many claims on the national budget. But the demands of an unstable geopolitical environment require the steady enhancement of capacity and readiness.

There are additional advantages to this option. By acting as a self-confident but neutral player that responds not only to the pursuit of its own national interests but also to the enhancement of humanitarian and environmental values, Wellington can position itself as a credible broker in the design of political or diplomatic mechanisms for the management of strategic rivalries. These mechanisms can moderate local conflicts and prevent their escalation to major wars and the use of weapons of mass

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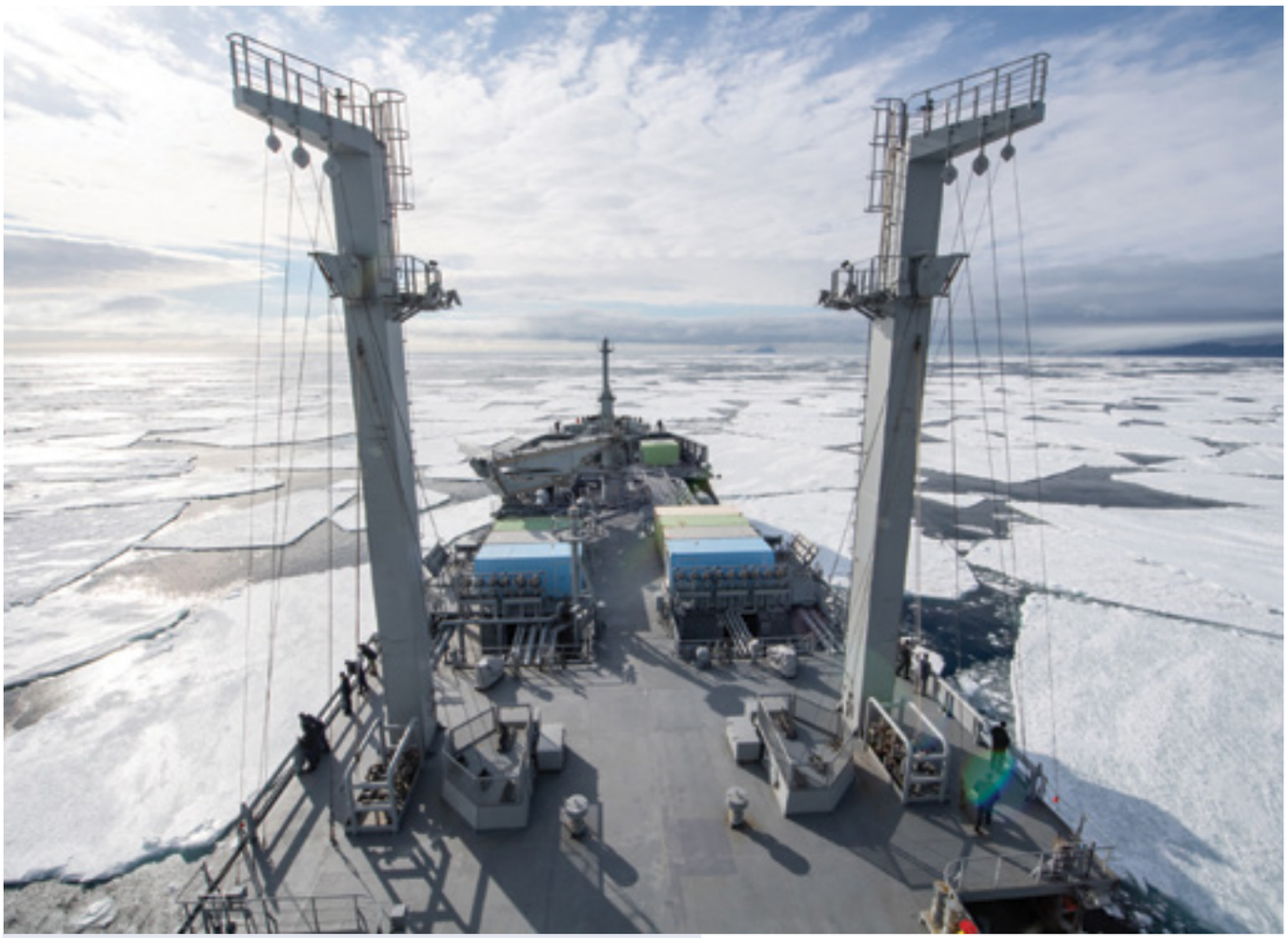
destruction. As the history of the Cold War indicates, geopolitical rivalries cannot be erased, but their intensity can be moderated so that strategic stability prevails. Moreover, the active participation of New Zealand in the Antarctic "great game" could increase national morale and revitalise the spirit of this small South Pacific state as a country of diplomatic innovators and frontiersmen.[18] By deploying its soft power, New Zealand can aspire to respect and benign influence in the coming Antarctic resource rivalries.[19]

However, an independent path is not synonymous with isolationism. Collaborative partnerships should be negotiated to advance New Zealand's interests in Antarctica. Diplomacy is the first choice, but diplomacy without military backup is less effective. Hence, Wellington needs to leverage its preferential access to US, British, and Australian military hardware and technology. Additionally, it can deal selectively with countries whose military-industrial complexes offer state-of-the-art weaponry and technology, such as Brazil, France, Israel, Japan, and South Korea. Finally, New Zealand needs to formulate an operational doctrine to guide initiatives in Antarctica and the surrounding Southern Ocean. For this endeavour, learning from the expertise developed by middle powers such as Norway, Chile, Canada, and Australia will be helpful.

Concluding remarks

According to the theories of classical geopolitics, states can be compared with living organisms struggling under Darwinian survival-of-the-fittest circumstances. To satisfy their needs and aspirations, their leaders often turn to territorial expansion. If so, the Antarctic will inevitably become a

18 Sinclair, *A Destiny Apart*.
19 As the historian Edward Gibbon wrote, 'The winds and waves are always on the side of the ablest navigators'.



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contested theatre. New Zealand needs to prepare for the implications of a geopolitical clash and resource competition in Antarctica. A growing budget for Southern Ocean security would be a step in the right direction. However, the quest for a greater geopolitical projection in the South Pole region is a demanding endeavour that will require a long-range whole-of-government effort. Wellington will have to formulate a comprehensive strategy that combines all the resources, strengths, assets, and capabilities of its national power.

In sum, New Zealand cannot afford to miss an opportunity to use its statecraft to position itself as a small but self-confident power in the Southern Hemisphere. Such a project, while ambitious, is worth pursuing because of its benefits not only for the national interest but also for international order, human welfare, and environmental sustainability. Granted, its implementation will be arduous, expensive, and maybe even perilous. But nothing of importance can be achieved in the realm of high politics without the willingness to face risks and bear costs. As Machiavelli might have said, if a government can cultivate *virtù* and *prudencia*, and then take advantage of *fortuna*, greatness can be achieved.

References

Alonso-Trabanco, José Miguel. "La Misión Rusa Arktika 2007 y Sus Implicaciones Para el Balance Mundial de Poder en el Siglo XXI." *Confines de Relaciones Internacionales y Ciencia Política* 5, no. 9 (2009): 85–101. https://www.scielo.org.mx/scielo.php?pid=S1870-35692009000100006&script=sci_abstract

Boulègue, Mathieu. "Five Eyes Strategic Interests in Antarctica: Implications of Contemporary Russian and Chinese Strategy." *The Polar Journal* 13, no. 1 (2023): 71–85. https://www.tandfonline.com/doi/full/10.1080/2154896X.2023.2205239

CIA World Factbook. "Antarctica." December 13, 2023. http://tinyurl.com/3sfaszzx

Dodds, Klaus. "Antarctic Geopolitics." In *Handbook on the Politics of Antarctica*, edited by Klaus Dodds, Alan Hemmings, and Peder Roberts, 199–214. Cheltenham: Edward Elgar Publishing Limited, 2017.

Friedman, George. "The Myth of a Rules-Based World." *Geopolitical Futures*, April 09, 2021. http://tinyurl.com/bdffec52

Gibbon, Edward. *History of the Decline and Fall of the Roman Empire*, 2. Christian Classics Ethereal Library, Chapter 68. https://ccel.org/g/gibbon/decline/volume2/chap68.htm

Haward, Marcus, and Jeffrey McGee. "Antarctic Geopolitics: Emerging Cracks in the Ice." *Georgetown Journal of International Affairs*, February 03, 2021. http://tinyurl.com/yc6zzku2

Mearsheimer, John. "The False Promise of International Institutions." *International Security* 19, no. 3 (1994): 5–49. https://www.jstor.org/stable/2539078

Morgenthau, Hans Joachim. *Politics among Nations: The Struggle for Power and Peace*. New York: Alfred A. Knopf, 1949.

Oliveira, Israel. *Brazil in Antarctica: The Scientific and Geopolitical Importance of PROANTAR in the Brazilian Strategic Surrounding Area*. Brasília: Instituto de Pesquisa Econômica Aplicada, 2020.

Sheikh, Pervaze, Bruce Vaughn, and Keeze Procita. *Antarctica: Overview of Geopolitical and Environmental Issues*. Washington, DC: Congressional Research Service, 2021.

Sinclair, Keith. *A Destiny Apart: New Zealand's Search for National Identity*. Wellington: Allen & Unwin New Zealand Ltd. in association with the Port Nicholson Press, 1986.

Spykman, Nicholas John. *America's Strategy in World Politics*. New York: Harcourt, Brace and Company, 1942.

Stone, Madeleine. "Antarctica's Ice Could Cross This Scary Threshold within 40 Years." *National Geographic*, May 10, 2021. https://www.nationalgeographic.com/environment/article/antarcticas-ice-could-cross-this-scary-threshold-within-40-years

Thucydides. *History of the Peloponnesian War*, Book 5. Wikisource, March 20, 2018. http://tinyurl.com/4dfyns2s

United Kingdom Foreign, Commonwealth and Development Office. "UK-Chile Letter of Intent on Antarctic Co-operation 2023 to 2028." December 07, 2023. http://tinyurl.com/4cn7w9ej

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MARITIME OPERATIONS IN THE INFORMATION ENVIRONMENT

Captain Rodger Ward, RNZN

The concept of information warfare can be baffling to those whose careers have focussed on traditional kinetic maritime warfare. In this essay, Captain Rodger Ward, RNZN, demystifies it. He points out that information warfare is integral to all levels and all platforms of the RNZN. 'Information Warfare is everyone's job', he asserts. Its principles are straightforward: 1) assure information, 2) use information to communicate, 3) use information to generate understanding, and 4) influence an adversary or target audience with information. He concludes with an inventory of skills expected of the modern "information warrior of the sea" that is worthy of serious consideration by every member of the RNZN.[1]

In late 2023, HMNZS *Te Mana* concluded her regional deployment with two successful firings of the Sea Ceptor missile, which were widely publicised. This topped off a busy year for our Navy that had started with disaster relief in the wake of Cyclone Gabrielle and saw successful deployments of HMNZ Ships *Manawanui* and *Matataua*, and the receipt of an unmanned surface vessel. All of this was conducted despite significant personnel shortfalls. These achievements demonstrate the expeditionary capabilities of our Navy, which achieves more than its small size might suggest.

New Zealand's ability to project sea power into the broader region demonstrates our commitment to the region and the strategic reach that a small nation with a massive maritime domain to manage can achieve. We should be aware that our achievements were observed by our friends, partners, peers, competitors, and adversaries. Our activities create an information effect that can manifest itself in three ways:

1. Cognitively, it may influence the perceptions abroad of the RNZN. We aim to be a trusted partner in the region and also a credible adversary.
2. Informationally, we need to have the ability to defend platforms in, and conduct operations through, cyberspace and the electro-magnetic spectrum. We are developing the ability to deploy and remotely operate surface vessels to collect information.
3. Physically, we have the ability to manoeuvre maritime forces to be in the right place to generate a desired physical outcome. We deploy a range of capabilities to create a presence in the region that exceeds our modest size.

Just as we use the full spectrum of our information capabilities to generate influence over target audiences, so do others. However, unlike New Zealand, other actors are prepared to violate internationally accepted norms and use information capabilities in malicious ways to achieve their desired effects on target audiences. For example, within the space of two years, we have seen Russia invade Ukraine, China threaten Taiwan and sponsor disinformation, cyber-espionage and hacking, Hamas attack Israel, Israel attack Hamas, and, most recently, the Iranian-backed Houthis attack shipping near Yemen, using cheap drone technology.

In this article, I aim to provide an overview of operations in New Zealand's information environment, and to stimulate an intellectual conversation about how to shape the next generation's RNZN. I believe that we need a Navy that uses a combination of cognitive, informational, and physical capabilities to reassure partners, to achieve an advantage over adversaries, and to be able to "win without fighting".

1 Captain Ward would like to acknowledge the assistance of Dr Chris Paul, RAND, Captain Andrew Watts, ONZM, RNZNR, Captain John Sellwood, RNZN, and Mrs Sophie Stewart, Ministry of Defence.

The Sea Ceptor is a sea-based supersonic missile defence system, fitted to HMNZS *Te Kaha* and HMNZS *Te Mana* | Credit: MBDA missile systems

Strategic context

The New Zealand Defence Force's operating model is becoming increasingly stressed in the face of a range of Information Environment[2] threats and challenges. These challenges are characterised by rapidly evolving technological change, a willingness for adversaries to conduct operations at all times, and a more complex geopolitical environment.[3]

State and non-state actors within New Zealand's areas of interest are actively using information activities to create uncertainty, undermine principles of international rules-based order, manipulate cognition and emotion, and ultimately to contest or constrain behaviour. This results in risks to people, populations, equipment, and systems, that needs to be managed.

2 The Information Environment (sometimes called the Information Domain) encompasses the policy, doctrine, concepts, technologies, platforms, systems, people and processes required to enable information warfare.

3 New Zealand Secretary of Defence, *Information Domain Delivery Strategy 2020.*

Risks to people and population

The NZDF's ability to operate in its area of interest is based upon social permissions that have been negotiated over time and are largely based on the 'unique cultural values that identify them as New Zealanders and influence NZ military doctrine and its application'.[4] Leveraging this unique identity to support messaging to target audiences has always supported successful operational outcomes in a way that New Zealand's security partners envy.

Increasingly, states are pursuing their objectives by operating in the 'grey zone', the space between peace and war that spans cooperation, competition, and confrontation. Activities such as propaganda, sabotage, deception, misinformation, clandestine military actions, and foreign interference have always taken place in this space. However, today, the tools to conduct these activities are increasingly available, cheap, and ubiquitous, and our increasing

4 New Zealand Ministry of Defence, *New Zealand Defence Doctrine NZDD-D,* 10.

connectedness makes our hēramana (sailors) increasingly vulnerable.

Actors engaging in grey zone activities seek to create or exploit uncertainty, which can shape others' perceptions around risks of escalation, including thresholds for armed conflict. These grey zone activities:

- provide states with a level of plausible deniability;
- are not well-addressed in international law; and
- hinder others' abilities to react, including in space, in cyber-space, and on the high seas.

The ability of the NZDF to affect the outcome of a campaign depends on leveraging the perception that New Zealand presents positive values and is "in and of the Pacific". This leveraging of perceptions plays a significant role in achieving mission and operational success.

Risks to equipment and systems

Increased capacity, through both technological advancements and joint operations to use and process information to achieve operational effects, has the ability to enhance the NZDF's effectiveness and efficiency. Increased capability also creates an area of potential vulnerability that will require non-traditional means of defence.

Compared with traditional military capabilities, information-based technology is pervasive and accessible. This creates advantages for the NZDF by enabling us to take an agile approach to our own information operations, including deploying information capabilities against our adversaries. It also requires that our own information be continuously defended.

The NZDF's reliance on information and information technology to mount both unilateral and joint operations presents any adversary with an opportunity for an asymmetric advantage if NZDF networks can be corrupted, damaged, or destroyed.

HMNZS *Te Mana* returns to New Zealand following its Frigate Systems Upgrade in Canada | NZDF

As noted above, our national reliance on information technology, and its increasing interconnectedness, means that a strategic information warfare (IW) campaign could be waged against our military forces, not only those deployed in distant theatres but also those in our domestic information infrastructure.

The *Defence Policy and Strategy Statement 2023* and operations in the information environment

The Defence Policy and Strategy Statement 2023 (DPSS)[5] identifies two primary challenges to New Zealand's security: growing strategic competition and the intensifying effects of climate change.[6] The DPSS states that advancements in technology are changing both the way contemporary security threats are manifested and the nature of military operations. The DPSS identifies how online media have enabled the spread of both misinformation and disinformation. Improving the relevance, timeliness, utility, and integration of information is highlighted by the DPSS as a way to contribute to New Zealand's ability to understand the security environment and to work effectively with partners. The ability to conduct operations in the information environment directly supports the foundational tenets of the DPSS as shown in Figure 1.

5 New Zealand Ministry of Defence, *Defence Policy and Strategy Statement 2023*.

6 On the challenge of climate change, see Warrant Officer Wayne Mitchell's essay in this volume.

Operations in the information environment

Operations in the information environment is an emerging concept that describes how military forces coherently:

- assure information;
- use information to communicate;
- use information to generate understanding; and
- influence adversaries or target audiences with information.

This is not a new phenomenon. However, the proliferation of communications and information systems in the modern battlespace means that the information received via a network or system exceeds what can be observed by the naked eye or read in books by orders of magnitude. It is no longer possible for a human being to process all of this information to make a good decision in the time available. Mission success is now reliant on high-speed data networks with multiple backup systems, advanced information processing and decision support tools, combined with human systems.

The emergence of cyberspace and the electro-magnetic spectrum as a fifth warfighting domain alongside land, maritime, air, and space requires a new set of skills and capabilities. These skills include information warfare tradecraft, information operations, network operations, electro-magnetic spectrum operations, cyberspace operations and space domain operations.[7]

7 *NZDF Operations in the Information Environment. CONOP,* dated 3 Oct 2023.

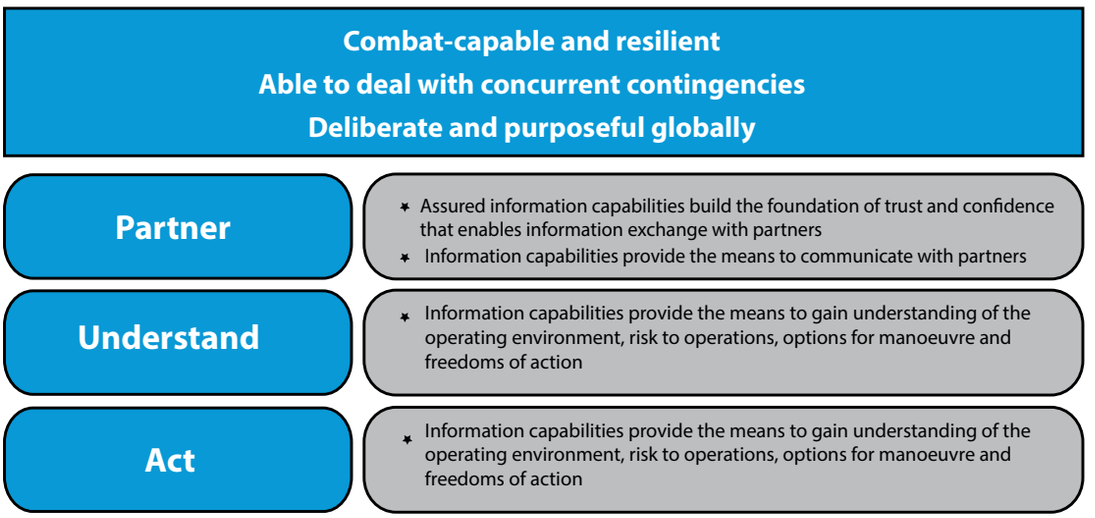


Figure 1 DPSS Themes Supported by Operations in the Information Environment

OUR PRINCIPLES

Angitu *Success*

Kotahitanga *Unity*

Mana & Pono *Influence & Integrity*

Kaitiakitanga *Guardianship*

OUR DESIGN PRINCIPLES

1 Our Identity is Our Advantage

- Our identity as New Zealanders enables us to generate effects information that no one else can. It is an advantage that can easily be taken from us by an adversary's information operations or by our own miscalculation or mistake.
- We will retain the physical domain expertise (Land, Air, Maritime).
- We will not lose sight of the benefits of our Service culture.
- We will create a compelling story on why we are doing what we are doing to gain momentum and attract the right people to the role.

2 Information Warfare Advocacy

- The IWD operating model will provide a functional authority that can direct, align and orchestrate the domain, arbitrate on priorities for investment, and advocate for the information domain.

3 Enable Manoeuvre In the Information Environment

- We will provide more coherent options that decrease the risk of conflict and the need for a combat response.
- The IWD operating model will enable IWCs to be reassigned and prioritised in respose to changing operational priorities.
- We will maintain the principle of mission command and assign the appropriate resources to the commander who is best placed to acheive information effects.

4 Information Warfare is Everyone's Job

- Everyone has a part to play in every aspect of information warfare.
- We will measure ourselves to ensure that we are getting the right effect from our information domain and be prepared to change our ways of working to improve our performance.

5 Implementation Must Be Smart

- We will approach change in a methodical, pragmatic way ensuring that the right resources are in place to progress.
- The information domain will partner with the skills and expertise of industry, academia, and Aotearoa's domestic and foreign partners to deliver information led operations that safeguard Aotearoa, New Zealand and its interests.

Figure 2 NZDF Information Warfare Principles

Information warfare (IW) principles

Information warfare (IW), like maritime warfare, is simply the art and discipline of conducting operations in the information environment. This is an emerging capability in the NZDF. A set of information warfare principles has been established to guide us. These are shown in Figure 2.

Maritime operations in the information environment

The information environment is now the non-discretionary environment where modern navies must be prepared to cooperate, compete, and contest simultaneously and persistently. The ability to integrate with partners is increasingly reliant on evidence that platform systems and procedures are in place to ensure information worthiness and enable advanced communications networks to share information. Threats to our national interests through the information environment, and the ubiquity of cyberspace, hamper our Navy's ability to operate freely in our area of interest. Modern weapon systems rely on information to operate, and emerging threat systems exploit vulnerabilities by conducting cyber and electro-magnetic spectrum operations. Navies that do not adapt to these changes will lose their relevance as legitimate elements of national security.

This next section takes a look at eight initiatives the RNZN should consider in order to enhance its ability to conduct maritime operations in the information environment. The analysis will be presented using the Assure, Communicate, Understand and Influence Framework. The initiatives are listed in priority order and summarised. They are suggestive rather than exhaustive, so as to keep this essay brief.

Figure 3 shows that every platform in the NZDF is reliant on the information environment to assure, to communicate, to generate understanding, and, if desired, to exert influence. The further to the right of the spectrum you go the more discretion you have. Each element is generally reliant on elements to its left being in place. The colours generally indicate responsibility areas: blue for Defence Digital, orange for Intelligence, and grey for Information Warfare. The distribution of colour also indicates the challenges in gaining coherence over this environment. To be effective in any domain the RNZN needs 1) assurance, 2) the ability to communicate, 3) understanding, and 4) offensive information capabilities. Each of these is discussed below.

Assurance

Secure missions systems and assured intelligence and mission data. This first factor largely relates to assuring that information, systems, and equipment are worthy for operational use. The foundations for this are already in place in the seaworthiness framework. Information security, emission security, and operational security are known and understood concepts that we regularly address. However, the emerging challenges such as cybersecurity, mission data validation, navigation and targeting systems assurance, countering influence, misinformation, information management, and information assurance are not as well-defined. The RNZN needs to focus on developing personnel talent with cybersecurity and data analytics skills.

Information worthiness of our hēramana and whānau. This second factor more deeply explores the human cognitive environment. An adversary is attempting to influence culture, values, the way we react, and behaviour in a more general sense. Most of us are subject to superficial types of influence every day by marketers who are attempting to attract us to buy their products. More insidious influences make us question or change our ways of thinking. An adversary seeking to undermine values, change behaviours, and undermine morale or will to fight would generally do this over a long period of time with very subtle changes and nuancing in messaging. This would aim to gradually steer a target audience to a new set of values or behaviours. These types of things are happening in our area of interest today, and our hēramana and their whānau are just as vulnerable as any other population.

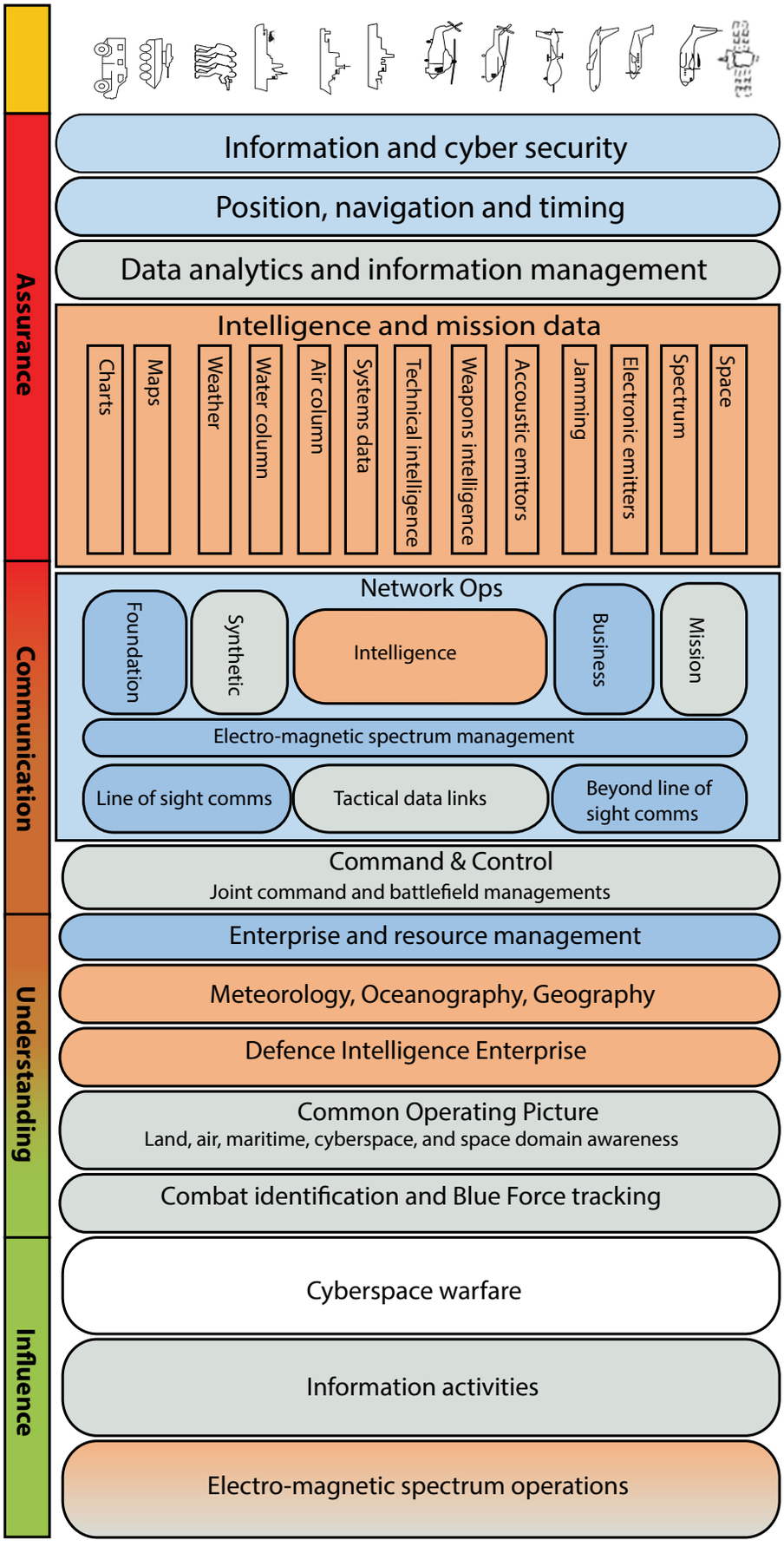


Figure 3 Assurance, Communication, Understanding and Influence Framework

While this is not a new phenomenon, new information age technology:

- enables it to happen faster;
- makes it more difficult to detect;
- enhances realism;
- uses complex algorithms to target specific audiences; and
- makes these influence activities more difficult to counter or defeat.

If we are to maintain our identity advantage as Te Taua Moana o Aotearoa, our worthiness frameworks will need to pay as much attention to the human dimension of information warfare as they do the technical.

Communication

Communication network resilience and electro-magnetic spectrum management. Our adversaries have already identified and exploited network systems vulnerabilities to disrupt, deny, degrade, destroy, interfere with, or limit our ability to conduct information exchange. The ability to "fight in the dark" and to restore networks requires continual practice. However, reliance on high speed data also requires a change in focus. The RNZN still practises visual communications with flags and flashing lights as a core communications requirement, yet modern warfare dictates distributed operations beyond line of sight and information exchange at speeds higher than physically possible with these means.

Information exchange must take place on networks at machine speed. This requires the primary, alternate, contingency, and emergency (PACE) communications plan to be part of the network. Navies that wish to operate in a contested information environment will need two types of upgrade:

1. They need to develop resilient and integrated communication network systems with the capability to dynamically route information through the most appropriate bearer systems.
2. They need to develop electromagnetic spectrum management capabilities that enable dynamic identification, allocation, use, or avoidance of available and contested spectrum.

HMNZS *Wellington* in Nuku'alofa, Tonga, with HMNZS *Aotearoa*, following the volcanic eruption and tsunami in 2022 | NZDF

Integrated by design. Warships take years to plan and build, yet technology changes almost daily, so naval architects need to re-think their design approach. Platforms need to be *designed* to integrate into the information environment first, but *fitted* to integrate into the information environment last. This is an impossible dream, but we can get close by disciplined design combined with a little risk-taking and a commitment to maintaining the integration baseline. We will have to overcome our innate desire to tweak what is already working to make it better. We will have to put more effort into integration and interoperability improvements. Participation in the AUSCANNZUKUS Project Overmatch is an example of this that should be explored.[8]

Understanding

Enhanced maritime domain awareness. Fully networked crewed or uncrewed platforms with a broad array of sensors that can maintain awareness of the maritime domain and activities going on in it have two significant benefits:

1. They reduce the opportunities for adversaries to conduct malign actions within it because they know they can be observed.
2. They enable force protection, prediction, and pre-emption with a corresponding increase in threat thresholds, meaning that a platform can remain on station for longer with less operational risk.

Crewed platforms only need to be used when human action is required to create an effect, for example, to conduct defence diplomacy or to interdict another crewed platform. There are two aspects to achieving this: 1) a crewed or un-crewed networked platform that can safely get to the place where its sensors can collect, and 2) investment in the people and resources necessary to turn sensor data into actionable information.

We've always been really good at the first aspect, but heavily reliant on partners for the second. In doing so, we abrogate responsibility for managing sovereign New Zealand data, create a burden for partners and limit the means to assure the accuracy of the processed data we receive back from partners. We have to know more about the information we are sharing:

- Is it immediately relevant to our own force protection?
- Will a partner assign priority to information that is only relevant to a New Zealand sovereign problem?
- How is a partner going to use the information we collect, and is their intended use going to expose us to reputational, legal or moral challenges?
- As the originator of the information, what value will we realise by sharing the information?

The RNZN, through the Defence Capability Plan, will need to invest in the second- and third-line mission support systems and analytics to make sure we understand these issues. This doesn't mean we must do it by ourselves; we need to leverage our partners' capabilities so that we apply the right resources to the problem for the benefits we expect to realise from the information.

Technology will also help resolve this problem, but not exclusively. In theory, automation, machine learning, and artificial intelligence enable us to operate platforms with fewer people. But the corresponding cost is the need for more people to manage the systems that are processing the exponential increase in data and human cognition, in order to make better decisions faster. This means we have to take a closer look at ways of working and the places where our people need to work. Enhanced maritime domain awareness will not always require us to put more platforms to sea, and we will almost certainly have to start comparing the value of the information and effect we achieve by deploying to sea (presence, posture, and profile) with the information effect we generate by processing, exploiting, and disseminating information that is relevant to the maritime domain.

8 Eckstein & Demarest, Project Overmatch.

Lieutenant Dillon Cooks, RNZN, on the bridge of HMNZS *Te Mana* June 2022 | NZDF

Influence

Deception. We've all been involved in the age-old game of trying to make the warship look like a merchant ship. It's always been great fun to bounce your Aussie playmate at seven miles in the dark, but deception takes on a more complex dimension in the information age. Deception now means deception across the entire electro-magnetic spectrum. You can't pretend to be something in the visible spectrum if your information footprint in cyberspace or the electro-magnetic spectrum says you're something else. As with integration, this now has to be by design. Our biggest ruse of war might actually be multiple hull types with different capabilities on the inside, yet identical electro-magnetic signatures. Imagine the adversary's confusion if a coalition force had equivalent hulls all with the same signature.

Presence, posture and profile. Information warfare is already in our Navy's DNA. Presence, posture and profile sit at the heart of defence diplomacy. We have all attended cocktail parties and participated in community activities ashore that contribute to key leader engagement and civil military cooperation to generate a positive message about our Navy. Some will have also seen the damage that can be done if we don't live up to a host community's expectations and norms. However, with more sophisticated and persistent challenges, the RNZN needs to be more deliberate in thinking about influence activities in cooperation and competition.

Every time a ship goes to sea, it needs to be delivering an information effect. It does this by demonstrating commitment, messaging target audiences, or protecting people, populations, equipment, and systems from influence or attack. This also needs to translate to where we train, who we train with, and what we train in. We should be aiming to get efficiency from every defence dollar we spend. We can no longer measure our output by the number of days spent underway; information warfare

has to be factored into everything we do. Sailors training at the Tamaki Leadership Centre need to be part of the RNZN's Information Warfare Campaign just as much as an admiral's visit to a foreign leader or a Southern Ocean patrol.

Deny, degrade, and destroy. These concepts remain largely unchanged and we will always hold to the Law of Armed Conflict when responding to a threat. The principles still apply whether in cooperation, competition, or confrontation. But the inclusion of cyberspace and the electromagnetic spectrum enables different types of responses. A response action can still be proportionate but it need not occur in the physical environment. A highly informed and networked warship can "call for fire" in response to an information threat just as to a physical threat.

Maritime operations in the information environment enable the desired effect of each platform to be achieved with the most appropriate capability within the network. This could be cognitive, informational, or physical. Because it's coming from within the network, choices can be made about attribution and asymmetry resulting in further uncertainty in the mind of the adversary. The future implication of this is that a lightly armed combatant that is well-equipped with sensors, redundant networked systems, and unique information capabilities is likely to be highly valued in a task group. The abilities to defeat a drone with directed energy or conduct offensive cyberspace operations are examples. If you add this to the deception factor mentioned above, then there is a high likelihood of achieving the information advantage necessary to out-manoeuvre an adversary in the information and physical environments, and thus win without fighting.

Ngā Hēramana o Te Moana o Aotearoa

I conclude with some commentary on our people. As demonstrated by our Information Warfare Principles, the heart of information warfare is about protecting our identity from harm and using it to project influence when other means cannot.

There is a minimum threshold for being invited to the coalition party, and that's normally based on sovereign responsibilities for self-defence and the integration or interoperability standard. But, let's face reality. We don't get invited to coalitions of the willing solely because of the kit we have, important though that is. The value that the RNZN provides during cooperation, competition, confrontation, and conflict all stems from our people and our national identity. We only need to reflect on HMNZS *Wellington*'s Operation Pacific Vaccinate efforts to understand the impact our people had on the outcome of that mission. The simple act of putting the right sailors in a boat to hand over vaccines generates immense public good will towards New Zealand, making it more difficult for others with aspirations of influence to find a foothold.

Information warfare is everyone's job. We need to make sure that the identity advantage present in every one of our sailors continues to develop and adapt to meet the needs of our modern and versatile Navy in this era of persistent competition. Although further analysis is needed, I would suggest the modern "Information Warrior of the Sea" would possess:

- understanding that their information behaviours are valued as assets to enhance the effectiveness of the Navy;
- skills and experience to assess the vulnerabilities of all our systems and equipment;
- awareness of the geo-strategic environment;
- experience in fighting through information attacks;
- ability to control our cyber and electromagnetic spectrum footprint; and
- agility to adapt and provide innovative information effects that we haven't even thought about yet.

These aren't new people and this isn't a new Navy. We have to do this with what we have, and we can.

References

Australian Defence Force. *Doctrine Publication 3.13 Information Operations*, August 2020.

Australian Defence Force. *Joint Doctrine Note 1-20: Manoeuvre in the Information Environment*, October 2020.

Eckstein, M., and C. Demarest. "Project Overmatch: US Navy Preps to Deploy Secretive Multi-Domain Tech." *Defense News*, December 9, 2022.

Morabito, D., USAF. "The Third Road Threat: Towards a Comprehensive Theory of Information Warfare." *Over the Horizon*, August 2021.

New Zealand Defence Force. *Operations in the Information Environment CONOP*, October 3, 2023.

New Zealand Ministry of Defence. *Defence Policy and Strategy Statement 2023*. https://www.defence.govt.nz/publications/publication/defence-policy-review-defence-policy-and-strategy-statement-2023

New Zealand Ministry of Defence. *New Zealand Defence Doctrine NZDD-D*, 10. https://www.nzdf.mil.nz/assets/Uploads/DocumentLibrary/NZDDP-D-4th-ed.pdf

New Zealand Secretary of Defence. *Information Domain Delivery Strategy 2020*. https://defsec.net.nz/2020/12/05/introducing-new-zealand-information-domain/

Paul, C. "Understanding and Pursuing Information Advantage." *The Cyber Defence Review*, Summer 2020.

US Department of Defence. *Joint Services Publication 3-04: Information in Joint Operations*, September 2022.

CAPTAIN RODGER WARD, RNZN

After joining the Navy in 1987, Captain Rodger Ward, RNZN, progressed through a variety of postings including Navigation Officer, Principal Warfare Officer, Surface Warfare Officer, Communications Officer, Operations Officer and Executive Officer. Upon promotion to commander, he served as Deputy Director Network Enabled Capability, Staff Officer Communications and Information Systems (J6) and Operations (J33) at HQJFNZ, taught operations in the information environment at the Malaysian Armed Forces Staff College and was seconded to the Ministry of Defence as the Operational Requirements Manager for the Defence Command and Control System. In 2018 he was posted to Kuala Lumpur as Defence Advisor liaising with Malaysia, Brunei, Thailand, and Myanmar, and was promoted to captain. His current post is Chief of Information Warfare with authority to develop the New Zealand Defence Force's information warfare doctrines and capabilities. Captain Ward's academic achievements include a master's degree in business administration, a bachelor of arts degree, a diploma in applied science, and a graduate certificate in communications and information systems. His decorations include the New Zealand Armed Forces Award and Clasp, the New Zealand Operational Service Medal, the New Zealand General Service Medal (Afghanistan Primary), the New Zealand General Service Medal (Bougainville and Arabian Gulf clasps), and the Defence Service Medal.

VALUING NEW ZEALAND'S NAVAL COMBAT FORCE: A WORLD-FIRST METHODOLOGY

Dr Jim Rolfe with Mr Derek Gill

HMNZS *Te Kaha* departs Auckland for exercises (2024) | NZDF

Described as "groundbreaking" by a prominent British scholar, Jim Rolfe and Derek Gill's methodology for valuing the RNZN's naval combat force has attracted international attention, and is being considered for wider application in the NZDF. This article summarises Rolfe and Gill's assumptions, their processes of analysis and assessment, and their conclusions. By comparing the "revealed value", "task-based value", and "existence value" they were able to identify convergences that gave them confidence in their findings despite the inevitably subjective nature of some of their assumptions and valuations. They conclude that 'this approach provides data that could be useful when making spending decisions about the RNZN within the NZDF and about the NZDF within the wider sphere of public policy'. These data could be essential in an era of budget stringency, in which the RNZN must make a persuasive case for funding in competition with numerous other agencies' bids.

New Zealand now knows with a fair degree of confidence that the combat force of the RNZN is worth somewhere between NZ$3.5 billion and NZ$10.0 billion when assessed over the 30-year expected lifespan of the RNZN's warships. This essay traces how this conclusion was reached and what other navies, and other combat forces, might learn from the process.[1]

First steps

In 2017, I (Dr Jim Rolfe) was asked by Naval Staff how New Zealand's naval combat force could be valued. My first step, after expressing some doubt that the task was possible, was to enlist the advice of an economist colleague of long-standing, Derek Gill. Our initial meetings with Naval Staff recognised the difficulties of working on an unprecedented project without clear guidelines or accepted methods for analysis. We agreed that any project would need to be incremental. We would set ourselves limited goals for each of several phases, with defined off-ramps at the end of each stage. This would allow either side to pull out of the project if they were not comfortable with the project's progress or direction. Naval Staff then commissioned us to provide an objective "let the answers fall where they may" piece of research and analysis.

By the end of 2017, we had drafted a feasibility study intended to provide a clear understanding of what analytical work had already been done in this area and how we might develop the project in detail. The feasibility study included a literature review with two aims. The first was to get a sense of what was not worth pursuing, based on work by other scholars. The second was to be able to explain the current state of knowledge to Naval Staff so they could satisfy themselves that the project was feasible. We also searched for an international defence-economics expert to act as a peer reviewer of our work and who would give Naval Staff a sense of security. Professor Keith Hartley of the University of York (probably the premier international expert in this area) agreed to collaborate. Valuing defence has been one of his career pre-occupations.

Literature scan

In any project of this kind, it is essential to understand what has already been examined by other scholars and analysts working in this field. Not only does this save time in that clear analytical dead-ends can be discarded, but it also stimulates the mind to think of alternatives that might have been missed by earlier researchers.

We found that while there had been some conceptual thinking, there had been little work done internationally on valuing

1 Those wishing to read the full report will find it on the New Zealand Institute of Economic Research (NZIER) website, https://www.nzier.org.nz/publications. This article presents only the salient points from that report, supplemented by additional insights developed during and since the project was completed.

(as opposed to costing) defence. This is not surprising given that costs are readily apparent in a way that value, given its often intangible nature, is not. The literature noted that military input costs should not be used as a substitute for the value output, so we discarded this approach as overly simplistic. Other articles suggested variously that both economic and non-economic values need to be measured; that a sense of the value of defence might be found by comparing defence with other forms of measurable public spending; that public willingness to pay was important; or that either the value of lives saved or the value of completed tasks could be measured. But the literature provided few suggestions as to how these could be measured in practice, and no suggestions at all about how to value a specific capability within the defence portfolio.

Despite the lack of substantive leads within the defence literature, what this analysis did give us was ideas for approaches that could work for capabilities rather than for overall defence value. The field of environmental economics has also been grappling with the problem of valuation where there is no market to set an independent measure of value. This discipline provided elements of the framework required and some possible approaches to valuation.

We decided to approach value as revealed by actual government use and development of the naval combat force, that is, value based on a specific task undertaken (potentially or in actuality) by the combat force and, separately, value as revealed by public preferences. We attempted to determine how the combat force had been used historically, so as to gain an understanding of successive governments' thoughts as to the utility of the warships. This allowed us to derive the government's historical "willingness to pay".[2] It was evident that over the years, governments have used the naval combat force variously to conduct combat or combat-ready operations; to support the international rules-based order; to send international signals about New Zealand's stand on issues; for protocol purposes; to support other government agencies; and to provide disaster relief and assistance. Clearly, governments have valued the frigates, in that there have been many uses for them. Without the frigates, New Zealand would have been constrained in its options for responding to different circumstances.

One understands intuitively that military equipment has both military and non-military uses. Equipment can be used for war-fighting and thus there is a military use value. Equipment can also be used for search and rescue or disaster response. The equipment gives value, but it is a non-military use value. Both the military and non-military use values would need to be captured to determine an overall value for the frigates.

Wider economic principles show that any form of overall value for defence would have both use and non-use components. Use value is fairly clear: it is the material return from using the asset or capability. If one makes a profit in a business, clearly there is a use value attached to the business. Non-use value is more difficult to assess. We have assets that we want and that we value, but for which we are unable to determine what profit we get from them. This is a form of existence value. National parks, for example, fall into this category. So, too, does much military equipment.

From these insights we posited that total value (V) was the sum of capability (C), or the non-use or potential use value for both military and other non-military benefits, and delivered capacity (D), or the actual use value for both military and other benefits. Thus, we derived the simple-looking equation of V = C + D.

Finally, we were confident that we would be able to determine public opinion regarding the value of the naval combat force in terms of existence value if we could develop the process and, more importantly, questions to use to gauge that public opinion.

By the middle of 2019 we had a framework, but we still had to devise measures for the non-use and use values, C and D. After a hiatus compelled by the onset of COVID-19, we determined that there were three useful approaches to determining these values, and also that there were methods for making these approaches work. In this intervening period, the UK Ministry of Defence published the results of a RAND Corporation scoping study that explored how to value defence forces in

2 That data set can be found at Table 13 in Appendix D of the full report cited in Footnote 1.

aggregate.[3] While the units of analysis were different, the findings from the RAND study gave us additional confidence about the approaches we had developed.

Our literature scan provided suggestions that we were able to adapt. This yielded three approaches or perspectives, as follows:

1. Governmental willingness to pay, based on actual decisions on using, maintaining, and upgrading the frigate force. This is "revealed value".
2. Expert views based on scenarios of potential use for deterrence purposes. We now prefer to call this "task-based value" as that better reflects the analysis.
3. Societal preferences in terms of how much should be paid to maintain the frigate capability, as stated by a random sampling of New Zealanders. This is "existence value".

1. Revealed value

To assess revealed value, we examined the government's historical use of the combat force, and the values as stated by successive governments and shown in policy documents such as defence white papers. That examination revealed a clear understanding by successive governments that the utility value of the naval combat force outweighed the costs, even if they could not measure the benefits in dollar terms. Such policy statements may be described as "stated preference".

To confirm that the revealed value actually matched the stated preference (that is, that governments were prepared to spend on the capability), we took historical cost data for the first 20 years of the ANZAC frigates' expected 30-year life. This data included operating costs plus the costs of successive upgrades to combat and communications systems, and life extension programmes, amongst others.

This approach provides a minimum or floor value because it is based on actual payments rather than on some expected value using future payment decisions that would have to be assumed. Using government discount rates to obtain a current (2019) value we found that the value of the frigates could be assessed as $5.8 billion over the expected 30-year life of the ships. The figure will vary according to the discount rate used to determine present value.[4]

2. Task-based value

Our assessment of task-based value was based on the insight that if any one component of the warships' actual or potential activity could be assessed, then a total value could be derived by determining the value of the task in relation to its contribution to the overall use of the ships. Although this sounds simple, it had never before been tried as a means of determining the value of defence assets. The apparent simplicity certainly conceals the fact that sometimes heroic assumptions had to be made about potential task use and its relationship to overall use. The assumptions throughout the process were tested with a group of defence and security experts and, while not definitive, proved to be plausible.

The second basis for this approach uses the concept of risk as the underlying issue for determining values. It is known by convention that risk is the multiple of the probability of an event occurring and the consequences if it does occur. There are a number of events within our analysis for which probabilities have been estimated and against which the costs can be set, with or without the event occurring. Although these are not quite assumptions, they have been treated as if they were. That is, they have been tested against the average of the understanding of a range of defence and international security experts.

We determined that one area for which hard data could be determined was the value of maritime trade. Protection of maritime trade and deterrence of attacks on it is a legitimate task for the naval combat force. But that protection is not done alone, so the contribution of other navies has to be taken into account. That protection also differs according to the strategic and operational environments within which the ships will operate, and the likelihood of operating in those different environments over time. More heroic assumptions were needed here. However, recent Houthi attacks in

3 Black et al, "Understanding the Value of Defence: Towards a Defence Value Proposition for the UK".

4 The discount rate is the interest rate applied to the present value of an asset adjusted to take account of the changing value of money over time.

the Red Sea do show how real threats to maritime shipping (and thus to international trade) can emerge unexpectedly and quickly, and thus that we could make realistic assumptions that conflict or other disruptions will occur within the lifespan of the ships.

We were able to determine data for New Zealand's maritime trade overall and for its trade on different routes, and we could make assessments (based on international forecasts) for the amounts by which international maritime trade might increase in coming years. We also made a calculation of the total allied naval forces in any area in which New Zealand might contribute either one or two warships for deterrence purposes. This is because New Zealand would provide only a percentage of total deterrence value and thus the value of the warships to New Zealand must be discounted accordingly.

The scenarios chosen ranged from a benign international environment, through regional trade disruption to major international conflict. The probability of disruption (that is to say, attacks) to maritime trade was assessed as ranging between very low (say 0.01% per annum) to medium (10% per annum). Alongside the probability of disruption, the likelihood of the different environments being experienced across the 30-year life of the ships had to be set. We estimated, for example, that a benign international environment (for shipping) would be experienced 15% of the time, whereas regional disturbances might occur for 36% of the time and global conflict might occur for 15% of the time. These figures were based on averages suggested by a group of international relations scholars and analysts.

The data we used for each scenario are shown on pages 11–13 of the main report (see Footnote 1). Here is one example in summary:

Scenario: Regional trade disruption through conventional conflict (e.g. in the Arabian Gulf or South China Sea)

In this scenario, states in conflict with each other conduct their conflict at sea, attempt to disrupt the trade of their opponent, and force considerable disruption to maritime trade, even where that is not directed to or from one of the parties to the conflict.

In summary:

- Localised significant danger to trade in the relationship of 60:40 between East Asia and the Indian Ocean.
- Value of local New Zealand maritime trade: East Asia $43.0 billion p.a.; Indian Ocean $10.0 billion p.a.
- Probability of disruption: 10.0%.
- Risk to regional trade: East Asia $4.3 billion; Indian Ocean $1.0 billion.
- Effect of frigates: East Asia 1.25%; Indian Ocean 3.0%.
- Value of frigates: East Asia: $32.0 million p.a.; Indian Ocean: $12.0 million p.a.

Therefore the value of New Zealand's naval combat force in this case when assessed like this is $44.0 million per annum.

Table 1 Likelihood of Occurrence for Operational Environments and the Associated Deterrence Values

Scenario	Likelihood of occurrence (%)	Deterrence effect value
Benign international enviroment	15	negligible
Regional tension	36	$3.9 million p.a.
Piracy	12	$2.1 million p.a.
Regional conflict	22	$9.7 million p.a.
International conflict	15	$7.0 million p.a.

That summary is self-explanatory with the facts and assumptions around the direction of trade and the likelihood of disruption to that trade set out. The effect of the frigates is determined by the contribution that New Zealand warships make, or could make, to any allied naval effort to protect shipping. The figures are derived from an assessment of the total of warships from friendly or like-minded states available to protect the trade.

This is just one scenario, though, and cannot be taken as definitive in assessing the full range of situations possible across the operational life of the vessels. Instead, each scenario needs to be rated according to the assessed likelihood of the situation applying across the life of the warships and the deterrence effect calculated accordingly. Table 1 shows our assessment of the likelihood of each scenario and the adjusted deterrence value for it.

By putting all these assumptions together and working through the scenarios, we estimated that the naval combat force provides (in 2021 values) $23.0 million per annum of deterrence value to New Zealand. When we set the deterrence task against other tasks we derived deterrence as being some 13% of the total utility of the naval combat force. The appropriate economic adjustments to determine net present value showed that the frigates are worth between $3.0 and $4.5 billion based on no growth in maritime trade at the lower end and 5% growth at the higher. The mid-point value for the 30-year life-span of the frigates is $3.7 billion.

3. Existence value

Existence value is the value one places on an item even though one can gain no direct or material benefit from it. A classic example of this is the range of art galleries and museums in New York that are valued by New Yorkers, even though most do not visit the galleries often. The value comes from simply appreciating that the respected resource exists.

In this approach we sought the views of a random sample of over 1000 New Zealanders (selected by a professional survey company) on their willingness to pay for the naval combat forces, for both their capability attributes and for their direct use. The participants were from a range of backgrounds and did not necessarily have any knowledge of defence matters, although they were given a short video explanation of the concept of the naval combat force. The process is known as a "discrete choice experiment", or sometimes as "conjoint analysis" and is intended to draw out the participants' ratings of different attributes held, in this case, by the combat force. One of the measures was of the willingness to pay taxes at different levels for the attributes. From this, the researchers were able to derive the assessed value of the warships for both capability and direct use.

The views of the survey participants are summarised in the full report (refer to Footnote 1) and there is a technical report in more detail prepared by the New Zealand Institute of Economic Research and available from the authors on request.[5]

According to the public perception survey, defending New Zealand is the most important attribute of the combat force, whereas its role in global security is the least important. The respondents themselves can be grouped into three broad clusters. The first cluster was the "hawks", who want attributes relating to New Zealand's defence and are willing to pay for it. The second cluster was what may be described as "stoic kiwi". This group is moderately willing to pay, but has diverse understandings of what they want to pay for. The final cluster were the "doves", who do not value warship capabilities or activities and consequently have a low willingness to pay. The stoic kiwi is not surprisingly the largest group, comprising more or less 50% of the participants depending on whether they were considering the capability of the warships or their direct use.

Further analysis of the data revealed that society is willing to pay between $3.4 billion and $4.3 billion (depending on the discount rate used) over the life of the warships for their direct use. The comparable figure for their capabilities is between $8.7 billion and $11.0 billion.

Relationship between the approaches

These three approaches are not overlapping but instead stand independent from each other. They are different ways of thinking about the issue. This makes them

5 Jim Rolfe: jim.rolfe@vuw.ac.nz
Derek Gill: derek.gill@nzier.org.nz

especially valuable as they all come to an answer within the same order of magnitude as each other. This provides a degree of confidence that the objective value of the frigates lies at least within this same order of magnitude no matter which approach to define that value is used, and even if there are problems with parts of any one of the approaches.

We acknowledge that each of the approaches has conceptual and practical problems. The revealed value is historical only. Future governments may not make the same decisions as past governments. However, past governments have found the frigate force to be a more than useful tool for a wide variety of uses and there is no evidence that that might change in future.

The approach based on deriving a value of a specific task and extending the value to account for all tasks required of the warships is dependent on the sometimes heroic assumptions made. We have attempted to validate those assumptions. But this approach is best seen as a framework and a guide for future analysis rather than an answer complete in itself. One obvious area of work would be to determine the protective effect of naval forces from historical examples, taking the effects of changing technology into account.

Finally, existence value as defined by a random group with no necessary knowledge of naval or national security matters must have a high "political" component. That is, the individuals within the group will bring their own politics and political understandings to the questions. The fact that the group is random counterbalances the political biases to some extent, but the answers are still somewhat subjective. That being said, all governments have to take subjective political issues into account when making spending decisions. Our analysis can at least offer a rational guide for such decisions.

Final thoughts

Elements of this form of analysis, especially the approach based on task value, have never been used before. In the words of the international referee Professor Keith Hartley, the work is "groundbreaking". That, of course, does not mean the answers are correct in their detail. But using three approaches allowed us to cross-check between them to the extent of at least seeing that all three came to very similar answers, suggesting that the approaches are plausible and not compromised by fatal methodological errors.

In summary, these approaches:

- canvassed an understanding of a national historical and political willingness to pay as expressed by funding towards frigate purchases and upgrades over the years;
- provided an understanding of the value of the frigates in deterring attacks on maritime trade in various circumstances leading to another value for the combat force derived from that deterrence value; and
- revealed society's willingness to pay as expressed through surveys of random and representative public opinion using conventional selection techniques to ensure the validity of the results.

An obvious question now is "So what, how does this help us?" One immediate answer is that this form of analysis provides data that could be useful when making spending decisions about the RNZN within the NZDF and about the NZDF within the wider sphere of public policy. But to be truly useful here, a similar analysis would need to be carried out for those other areas of possible spending against which the naval combat force might be measured. This suggests an agenda for future research.

A second answer, for the slightly longer term, is that these approaches could possibly be used across the NZDF. There would no doubt be issues of deciding what to measure and how to measure it. But those issues can be overcome.

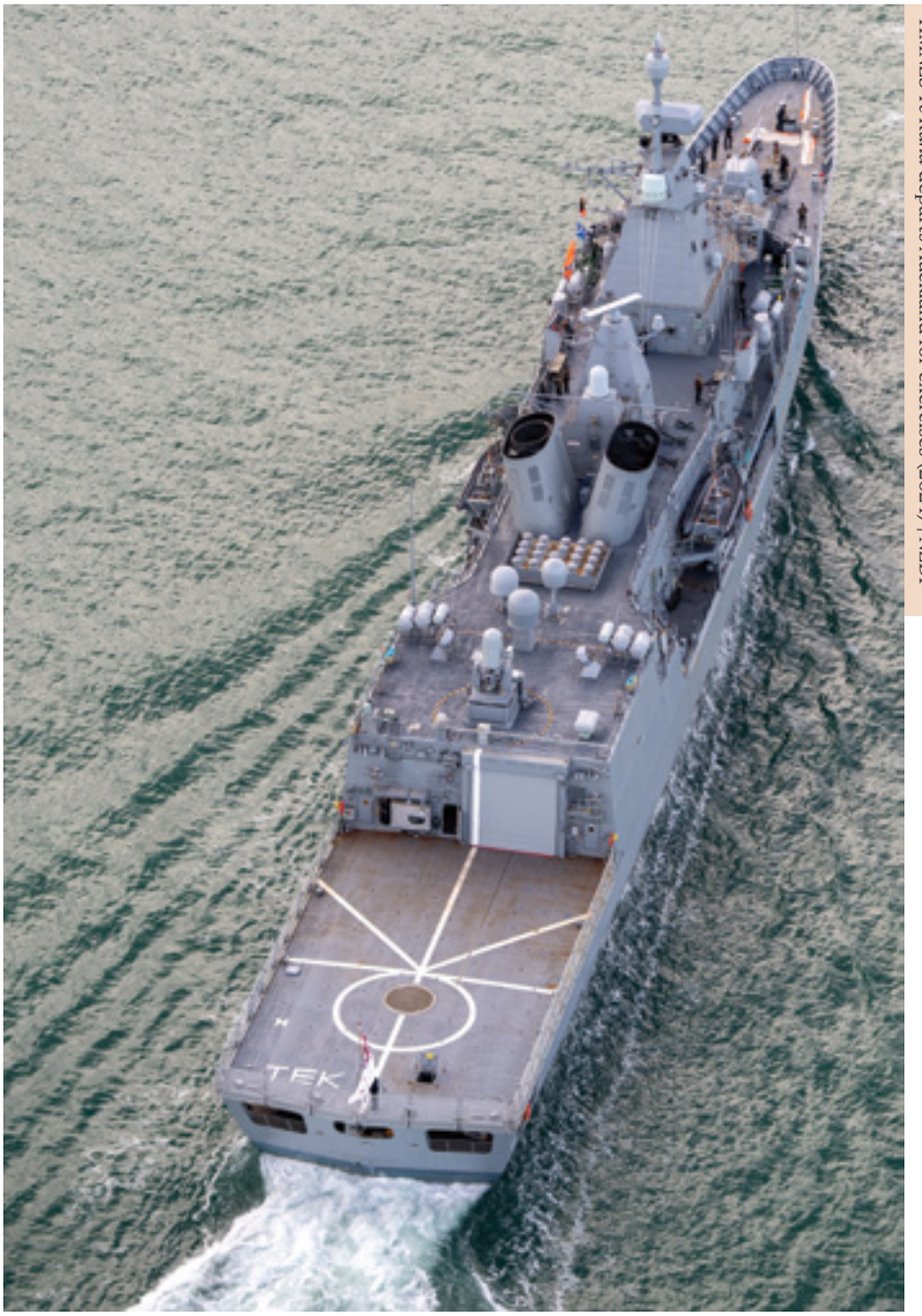
A final answer is that this is a form of analysis that could act as a starting point for other analysts abroad to refine so that one could have confidence in the results to the extent that they are considered authoritative.

We are beginning to see indications that our study has received attention not only from other Services of the NZDF but also from naval circles abroad. We believe that there is potential for the techniques to be applied internationally, perhaps within other armed forces, perhaps to determine the value of joint or cooperative military

activities. What is required is a willingness to undertake analysis that, at least initially, does not guarantee a definitive answer, only a set of approximations and goals. Combined with that, there must be a readiness to fail if the paths chosen are shown to be analytical dead-ends. However, our analytic assessment does show that given sufficient imagination and eclectic methodology, a useful result can be achieved from a daunting starting point.

References

Black, James; Richard Flint, Ruth Harris, Katerina Galai, Pauline Paillie, Fiona Quimbre and Jess Plumridge. *Understanding the Value of Defence: Towards a Defence Value Proposition for the UK*. RAND Corporation, 2021.



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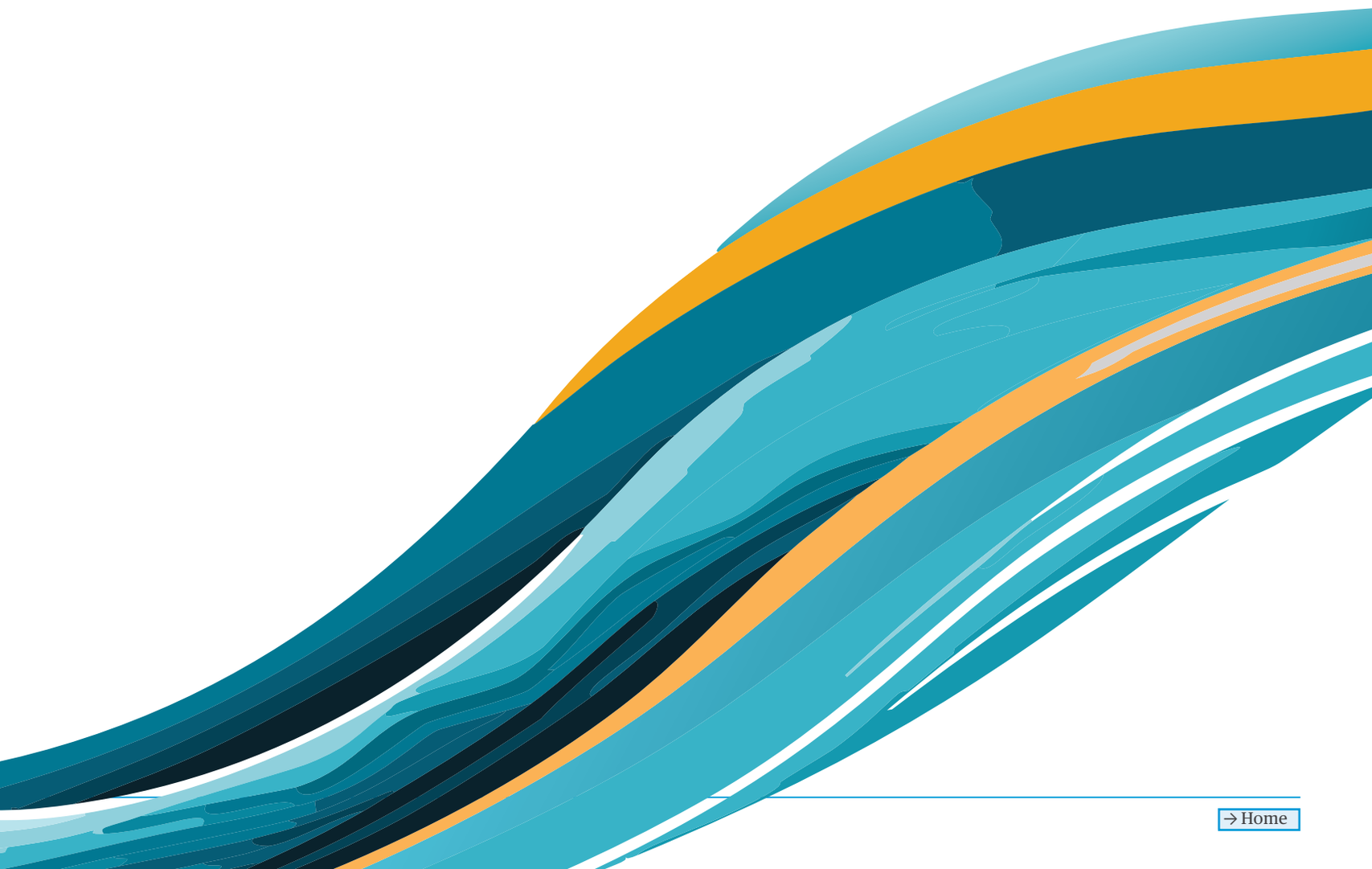
PART 3:
ADAPTING TO THE FUTURE



Source: Defense Visual Information Distribution Service (DVIDS)

PREPARING FOR MULTI-DOMAIN OPERATIONS: LESSONS FROM UK AND NATO

Vice Admiral Paul Bennett (Rtd.), CB, OBE

Drawing on his experience in the Royal Navy (RN) and NATO, Vice Admiral Paul Bennett (Rtd.), CB, OBE, identifies the emerging challenges posed by multi-domain operations. To remain relevant in the new security environment, armed forces, including the NZDF, must 1) adapt to new technologies, 2) enhance interoperability and interchangeability, 3) undertake digital transformation, and 4) develop a transparent relationship with industry. Acknowledging resource constraints, Bennett believes that it is vital not to be fixed by the scale of the challenge, but to start taking small steps that deliver incremental improvements in capability, while changing the culture at the front-line and moving steadily towards the long-term vision.

The challenges

The modernisation challenges to armed forces across the western world are urgent and broadly similar. New Zealand acknowledges many of these challenges in its pending Defence Capability Plan (DCP)[1] based on last year's publication of the *Defence Policy and Strategy Statement 2023*[2] and *Future Force Design Principles 2023*.[3] This essay seeks to explore some of the common challenges that are emerging, and to point to possible solutions. It is based on the author's perspective of the UK and NATO experience. It goes beyond specific policies and highlights the importance of breaking down cultural and process barriers, thinking differently, and generating momentum in the wider defence endeavour. The aim is to enhance the credibility and capability of western armed forces, on which maintaining a war-fighting edge and deterring adversaries depend.

Across the globe, nations and alliances are wrestling with the same contemporary operating challenges. These include the

1 New Zealand Ministry of Defence, *Defence Capability Plan*.
2 New Zealand Ministry of Defence, *Defence Policy and Strategy Statement 2023*.
3 New Zealand Ministry of Defence, *Defence Policy Review: Future Force Design Principles 2023*.

increasing possibility of state-on-state conflict; the need to embrace digitisation; the growth of domains in space, cyber and information; the ability to operate with a wide range of allies and partners; and the synchronisation of militaries with other levels of power as part of a national endeavour. These realities have resulted in a number of developments in which armed forces are obliged to:

- change the way they fight (multi-domain operations);
- deliver capability in a different way (emerging and disruptive technologies);
- improve connectivity with a range of allies and partners (interoperability-interchangeability);
- apply increased levels of imagination and ingenuity (innovation); and
- enable digitisation of all elements, including the use of AI and machine learning (digital transformation).

And this is all to be done by armed forces that have limited resources, are operating "hot" because of the scale of current demand on their services, are managing ageing platforms and are constrained by legacy IT that feels anything but modern, technical or digitised.

De-mystifying the challenges

As a retired senior officer from the Royal Navy, I can say, with no small amount of self-reflection, that it is easy to fall into the trap of giving broad, superficially compelling direction, that lacks the specificity and priority to steer organisations through the emergent competing requirements. Comments like "better interoperability with allies and partners, including those cross-government", "embrace AI and machine learning and innovation" or "improve the relationship between industry and the armed forces" are readily deployed in speeches and articles but seldom implemented. This is not to criticise; it is, after all, the role of the leadership to give broad direction. Nevertheless, where these statements are addressing areas in which an end state is not defined and where incremental, bottom-up progression is needed, such broad, unbounded statements neither provide the context, nor the priority or resources for further work.

One of the key failings in this regard is the imagination of a *nirvana*, but one that feels completely disconnected from the realities at the front line. It is vital, in the same way as in more tangible, platform-centric programmes, that once the vision has been articulated, that work to unpack them from the absolute is undertaken. For example, we will need to be more interoperable with some partners than others, our ability to work in all domains of warfare will be different in different environments, and application of technology will be, inevitably, uneven. Prioritising (including the counter-cultural task of identifying areas of low priority in which to disinvest) and establishing short-term goals to generate momentum are, in these areas of system development, more important than the broad sweep of the hand towards a golden future.

A triple focus

Of all the programmes underway in western armed forces, three seem to feature most strongly. These are:

1. multi-domain operations;
2. interoperability and integration; and
3. digital transformation.

Of course, it is yet to be determined how the NZDF will approach these in the DCP. Its *Strategic Plan 2019–2025* already identifies the goals of 'Networked and integrated joint capabilities' and 'Integrated information and cyber capabilities' but with details yet to be specified.[4] Whatever the eventual wording of the updated goals in the DCP, my contention in this essay is that, in light of the scale of the challenges to achieving these almost boundless, system-based capabilities, there are three key steps that can enable progress. Firstly, define the operational output required in the short-term allowing capability shortfalls to be identified and tackled. Secondly, establish a relationship with industry that will generate better understanding and, where possible, a partnership for delivery. And thirdly, start delivering something, thus generating momentum by placing capability in the hands of those at the frontline as soon as possible.

4 *New Zealand Defence Force Strategic Plan 2019-2025 - Operationalising Strategy 25.*

1. Multi-domain operations (MDO)

Intent. The concept of operating in five (for some militaries six or seven)[5] domains simultaneously, has become the framing concept for recent operational thinking. In NATO, the MDO Concept is a high-level framework with work going on by Allied Command Operations to bring it to life at the front line, and by Allied Command Transformation to embed it in future development. Many allies have written their own concepts: Joint All-Domain Command and Control in the US, Multi-Domain Integration in the UK[6] and Multi-Field Multi-Domain in France. Nevertheless, to develop it, MDO needs to be broken down. Most importantly, it needs to be explained from the start-point of today. For some, it is presented as something completely new, transformational in its nature, demanding considerable adaptation and rapid digital transformation. For others, it is an incremental move forward from "jointery", requiring greater synchronisation and improved situational awareness in all domains, but something that will require only steady adaptation of current doctrine. And whether multi-domain is a strategic, operational or tactical concept, or all three, is not universally agreed.

Moving forward. Whilst in its most ambitious form MDO will require considerable investment and change, the distance to the ultimate destination should not stymie commencement of the journey. Improved situation awareness tools, adaptation of HQ processes and structures, and exploration and reinforcement of mission command principles can all be progressed within a MDO frame. However, without doubt, the areas that need the greatest early focus are space and cyber, in which demystification of expectations is vital. MDO does not demand that all commanders have the same level of space and cyber situational awareness as the

5 The French reflect five "environments" (air, maritime, land, space and cyber) and two "fields" (information and electromagnetic).

6 Joint Concept Note 1/20 - *Multi-Domain Integration*.

Source: Defense Visual Information Distribution Service (DVIDS)

operators in these domains. Nevertheless, defining the constituent parts of a cyber and a space picture at the strategic, operational, and tactical levels will help focus those responsible for their development. The cultural challenge of sharing cyber and space information to the degree required to synchronise these domains into operational thinking also demands focussed thought.

In cyber, simply hoping that a commander will request an effect that happens to match something that the cyber gurus have up their sleeve is a weak basis for delivering operational capability. Rather, commanders need to understand what is available (even if just in principle), so that they can take it into account as they build their multi-domain plan. And the same is true of the space domain, which will be relatively limited below the strategic and operational levels. Having said that, though, at the tactical level, the logic of the space domain needs to be broadened. It is not just about the ability to use space as an effector, but also about understanding what space assets need to be defended, and being able to operate resiliently with or without space enablement. And, it will be crucial to identify the situational awareness tools, the "glue", that brings all domains together, that brings to life the synergies and dependencies to enable decisions, and forms the basis of the further development of MDO skills over time. De-mystifying how five domains can operate together, without losing the hard won (and easily lost) gains of jointery, should be the first step, without losing sight of subsequent steps and ideal goals.

2. Integration and interoperability

Intent. Like those of many other nations, New Zealand's policies acknowledge the importance of interoperability, which 'underpins effective combined activities, and supports Defence's global credibility and influence'.[7]

Taking the interoperability theme further, the *UK Defence Command Paper 2023*[8] challenges the British Armed Forces to 'enhance integration: across all Services... across domains... across Government.... across the spectrum of conflict... with industry... across regional theatres... with allies and partners'. The intent is clear but ambitious.

Moving forward. It is impossible to argue against the desire for greater integration/interoperability. However, from a generally strong baseline of existing interoperability, it is also crucial that further development is based on an operational demand rather than a notional (and unachievable) utopia where we are interoperable at all levels with everyone. Take NATO as an example: interoperability is NATO's lifeblood. Without it, the Alliance would be just a collection of armed forces and not an organisation that is more than the sum of its parts. Through decades of hard work, countless committees, and hundreds of standardised agreements (STANAGs), the Alliance has a strong foundation of interoperability and sustains an intense level of activity to maintain it. But it still seems difficult to answer the question about whether we are interoperable enough, or where the main interoperability shortfalls exist. Our logic tends to revert to the extensive input activity at the tactical (normally CIS) level, rather than an output-based strategic or operational assessment that judges interoperability against the way the Supreme Allied Commander Europe intends to fight.

This final point is crucial: the level of interoperability required must be scaled to meet operational needs. If, for example, the operational plan is for units of different nations to operate in separate geographic areas, then interoperability is required only to enable coordination and deconfliction. If, rather, forces from different countries aim to operate as a single integrated force, then the interoperability requirement is far more challenging. An interoperability standard set by the commander, therefore, would allow shortfalls to be identified and

7 New Zealand Ministry of Defence, *New Zealand Defence Policy and Strategy Statement 2023.*

8 UK Ministry of Defence, Defence Command Paper 23 - "Defence's Response to a More Contested and Volatile World".

prioritised, for development efforts to be focussed, and for residual operational risk to be assessed. This logic is true whatever element of interoperability is being pursued. Without it, there is a danger that the demand for more integration becomes simply a hollow mantra of senior officers and results either in organisational stasis through the absence of specific direction, or, in frenetic, poorly-focussed activities that may achieve a raft of disconnected, tactical improvements but collectively fail to move towards the vision to a significant degree.

3. Digital transformation

Intent. One of the comforting elements of delivering MDO and improving integration is that (at least part of) the solution is known: the improved exploitation and sharing of data. Various defence digital strategies highlight the importance of 'the networks, gateways, hosting services, user interfaces (including identity management and access mechanisms) and middleware that come together to deliver data and information wherever and however we need to exploit it'.[9] The exploitation, analysis, and presentation of data available to today's decision maker is already part of many defence strategies, even if, in most, it is relatively nascent. For example, both NATO and the UK are committed to delivering a "digital backbone" and to improve the digital fluency of their people.

Moving forward. The strategic efforts to change the armed forces and supporting organisations to a digitally-based endeavour will take many years. Large change programmes, such as the delivery of the digital backbone, are important, but must be paired with more tactical activity focussed on generating momentum and starting to change the culture of the organisation bottom-up. In doing this, one of the fundamental considerations is to define the information required by the user and then explore whether appropriate data sets are available. If they are, the task of integrating them with others can proceed. If not, then efforts should be made to develop a new data set whilst exploring the short-term synchronisation of legacy analogue data with the developing digital sources.

None of this will be easy. For example, I assume most would struggle to define a cross-government or a Ministry of Defence (MoD)/Industry picture. Even within the military, the effort to improve situational awareness tends to focus on generating and sharing the best tactical picture rather than defining the discrete information requirements of an operational commander. It is a huge undertaking, something that can only be achieved through bottom-up, incremental, but rapid, acquisition of currently available technology. Enabling this effort requires a system that facilitates integrating data and presenting a composite picture and enables organisations to explore what data they need and, to the extent that the data exists today, share it with stakeholders.

Develop a new relationship with industry

> *Political and military leaders do not necessarily adopt the newest technologies, despite their commercial availability, or use them in innovative ways that enhance their military effectiveness and operational advantage. Equally, defence innovation is not limited to the use of the newest and most advanced technologies. Rather, varying cultural, strategic and historical contexts shape states' perceptions of how new technologies can be integrated into defence and new operational concepts developed.*[10]

One of the key enablers of any nation's ability to deliver capability change within the armed forces is the relationship between the armed forces and its defence industry. Once again, the calls for a "better" and "more transparent" relationship and, where possible, "partnership" have been a feature of conferences, speeches and papers for many years. It is, therefore, an indication of how difficult it is to achieve these goals, and that these well-meaning statements rarely lead to substantive change, skewered

9 United Kingdom Ministry of Defence, *Data Strategy for Defence*.

10 Soare & Pothier, "Leading Edge: Key Drivers of Defence Innovation and the Future of Operational Advantage".

Source: Defense Visual Information Distribution Service (DVIDS)

as they are by the constraints of the procurement system and the complexity and scale of the multi-national defence sector. However, the environment has changed to such a degree that continuing to fall short in delivering a closer relationship can no longer be tolerated.

Firstly, the experience of Ukraine's defence against Russia brought into stark relief the necessity of the industrial base for delivering sustainability and resilience during state-level conflict. Sovereign capability, multinational partnerships, and the capacity of the industrial base have become crucial determinants of the ability to wage state-level warfare.

Secondly, the days in which the spending power of ministers of defence gave armed forces the monopoly on advanced technology have ended. With the extraordinary scale of technical advances in civil society, the only effective response is for armed forces to apply this technology to military problems is the only effective approach for most assets other than the platforms themselves. If not, the speed of defence procurement will simply result in the purchase of equipment with only legacy technology.

Thirdly, in seeking to procure high-tech systems, it has become impossible for the user to define the capability end state with sufficient accuracy to satisfy the needs of the traditional, fully costed programme. Instead, capabilities will need to be delivered through incremental, spiral development, enabling the customer to agree on the first step and then to assess progress before committing to the next move towards the intended end state. Enabling this will require changes both to current procurement policies and to the relationship with industry.

And lastly, as ideas and novel technical solutions are generated by innovation hubs or accelerators, armed forces must develop an assured route to absorb and scale up the most promising into the military capability

portfolio. Once again, this can only be achieved by adapting the processes and relationships that exist today.

Some solutions

There is no easy fix, but there are some recognised areas in which change needs to occur.

Culture. Cost, schedule, and performance in procurement have been and remain the predominant factors in defence procurement. However, the application of each reinforces the traditional customer–supplier relationship, and they should be the foundation, but not the core, of the professional partnership formed by the defence acquisition professionals and industry. We are, of course, all victims of our upbringing and, in this regard, the existing MOD–industry relationship, with its project management framework and the associated penalties for transgression, are entrenched in our psyches. It will take time to adapt the processes and even longer the culture, which is, of course, why starting the process now is so important. Soare and Pothier, who studied defence procurement for the International Institute for Strategic Studies, succinctly describe the scale of the problem. They state that the British, French and German systems 'lack direct channels, planning, partners at appropriate levels of political decision-making and agency' and that 'human-talent acquisition, retention and upskilling to feed defence-innovation systems is a strategic challenge'.[11] They prescribe a broad approach to change across the whole system.

Improved understanding and partnership. Perhaps the most pressing and, potentially, the easiest target is improving shared understanding. The reticence of ministers of defence to share capability shortfalls, or for industry to share its intellectual property, has resulted in superficial defence–industry relationships. Looking ahead, at the very least, ministers of defence must articulate the prioritised capability shortfalls they face. This should be done comprehensively and, wherever possible, at a classified level. Additionally, industry should be engaged early in the procurement cycle, well before the tender process commences, in order to share perspectives, improve collective understanding of opportunities and constraints and map out a realistic path to rapid delivery. In New Zealand, the establishment of defence industry engagement teams[12] sounds very positive. In addition, the experience in the UK has shown that having embedded industry representatives has proved highly effective and is possible within the existing rules of competition.

Spiral development. With perhaps the exception of the US, which has been able to allocate significant funding to innovation hubs such as Kessel Run,[13] most countries have struggled to embrace the practicalities of spiral development. The UK's intent is clear: *The Defence Command Paper* states that there is the need to 'build in the financial headroom to respond to changing needs, enabling us to iteratively develop – or "spiral" – our capabilities',[14] and 'we must therefore drive greater pace and agility into how we acquire military capability for the front-line, including by prioritising timely delivery over perfection'.[15] The concept of a programme budget, part of which is allocated to the first spiral, with the rest protected for future development is alien both to existing procurement and resource management processes. But without longer-term budgeting, defence establishments will continue to struggle to define future system capability requirements, and the eventual results will miss the target.

Capability off the shelf. Taking "capability off the shelf" (COTS) features in many intent documents. New Zealand's MoD states that the Defence Force 'will seek lower system complexity, including acquiring off-the-shelf instead of bespoke military capabilities where possible'.[16] Nevertheless, process constraints and, probably more pivotally, the cultural aversion of militaries to compromise, have become stumbling blocks to COTS adoption. Living to the mantra of "80% is good enough", when the capability is designed to be fielded operationally where people's lives are dependent on performance is, unsurprisingly, difficult.

11 Soare and Pothier, "Leading Edge".

12 New Zealand Ministry of Defence.

13 Kessel Run is a United States Air Force software development laboratory based in Hanscom Air Force Base, Boston, Massachusetts.

14 UK Defence Command Paper 23 - "Defence's Response to a More Contested and Volatile World".

15 Ibid.

16 New Zealand Ministry of Defence, *New Zealand Future Force Design Principles 2023*. Also see Curlewis's essay in this volume.

But once again, without COTS, supported by spiral development, procurement will be inaccurate, expensive, inefficient and ultimately less effective. There are risks, of course, for the armed forces to compromise in capability, but also for industry that acceptance of their COTS system might be for the first spiral but fail to become the enduring solution.

Innovation. Our innovation efforts should be mainlined, not discrete disconnected activities. We must be innovative in everything we do and our finite resources, particularly in people, need to be focussed on solving current problems with innovative ideas. As Soare and Pothier comment, 'the inherent adjustment implicit in defence innovation includes redesigning and implementing a new relationship between defence establishments and societies, particularly expert communities in private industry and academia'.[17] A truly innovative organisation will be less resistant to change and, therefore, should become much more effective.

Start building momentum

There is an imperative of time in all of this. Our adversaries are adapting, some through war, others by observing others' wars, and there is an implicit need to move fast enough to retain advantage. Whilst this state of competition is not new, I hope I have made the point that the current environment means that change is not optional if we are to retain our relevance. While major change programmes continue, my contention is that, in the non-platform areas of capability development, front-line momentum represents the crucial bottom-up "twin" of the longer-term top-down processes.

There are some very practical reasons why this is ever more essential in today's efforts to change:

- Firstly, the investment in innovation generates small scale minimum viable products (MVPs). These should be presented to the front-line in order to improve capability where possible, but at the very least in order to be tested while the mechanisms to scale them up are developed.
- Secondly, the front-line should become a laboratory for ideas. Clearly, this needs to be carefully calibrated to add value, not divert attention, but placing potential capability in the hands of the warfighter enables an assessment of utility and of shortfall to be made. There is much talk about an appetite to "fail fast" in innovation and, while I am not convinced that governments have the luxury to do this routinely, they should be able to invest in capabilities, experiment, adapt and, where appropriate, continue or step back.
- Thirdly, in a similar vein, fighting across five or more domains, embracing the opportunities of data visualisation, and understanding the limitations and benefits of AI, will require culture change.

By flowing capability forwards, the warfighter can start the process of change, embracing ever more mature products as they are developed, and adapting procedures to embrace them. And finally, there is a significant credibility and morale element to this. At the front line, the realities of inadequate communications systems, limited access to cyber capabilities, and analogue, paper-intensive processes, sit awkwardly alongside the technology-rich futures espoused by their leaders. If those front-line operators can become part of the delivery of the future, there will be immediate benefits to the organisation from both morale and capability perspectives.

Conclusion

The pressures on armed forces to reform are significant and come on top of high operational demand and resource limitations. Each of the areas of development covered in this essay are ambitious in their ultimate intent, and essential for contemporary operations. But they have the potential to become indigestible if not deconstructed and prioritised. None of these areas of development can be achieved in one bound, but rather they must be attained in a series of steps, calibrated against the way the nation intends to fight and the progress of its adversaries. There is no established development path – every nation will adapt in their own way and at their own pace – but there is plenty of experience that can be gleaned from others. Clarity of requirements measured against real operational demands, and prioritisation of effort, will ensure that activity is coherent and progress is possible. The constraints

17 Soare & Pothier, "Leading Edge".

that prevent a transparent partnership with industry, or that fail to set a route through which innovation can be brought into service, must be removed. This requires a change of culture and will test all nations. Finally, starting now, developing steadily and generating momentum at the front-line will enable our war-fighters to test technology alternatives and recommend better processes of capability development. Our effectiveness in multi-domain operations, and ultimately our battle-winning capability, rely on their innovations.

References

New Zealand Ministry of Defence. *Defence Capability Plan*. Wellington: New Zealand Ministry of Defence, June 2019. https://www.defence.govt.nz/publications/defence-capability-plan-2019/

New Zealand Ministry of Defence. *Defence Policy and Strategy Statement 2023*. https://www.defence.govt.nz/publications/publication/defence-policy-review-defence-policy-and-strategy-statement-2023

New Zealand Ministry of Defence. *Defence Policy Review: Future Force Design Principles 2023*. https://www.defence.govt.nz/publications/publication/defence-policy-review-future-force-design-principles-2023

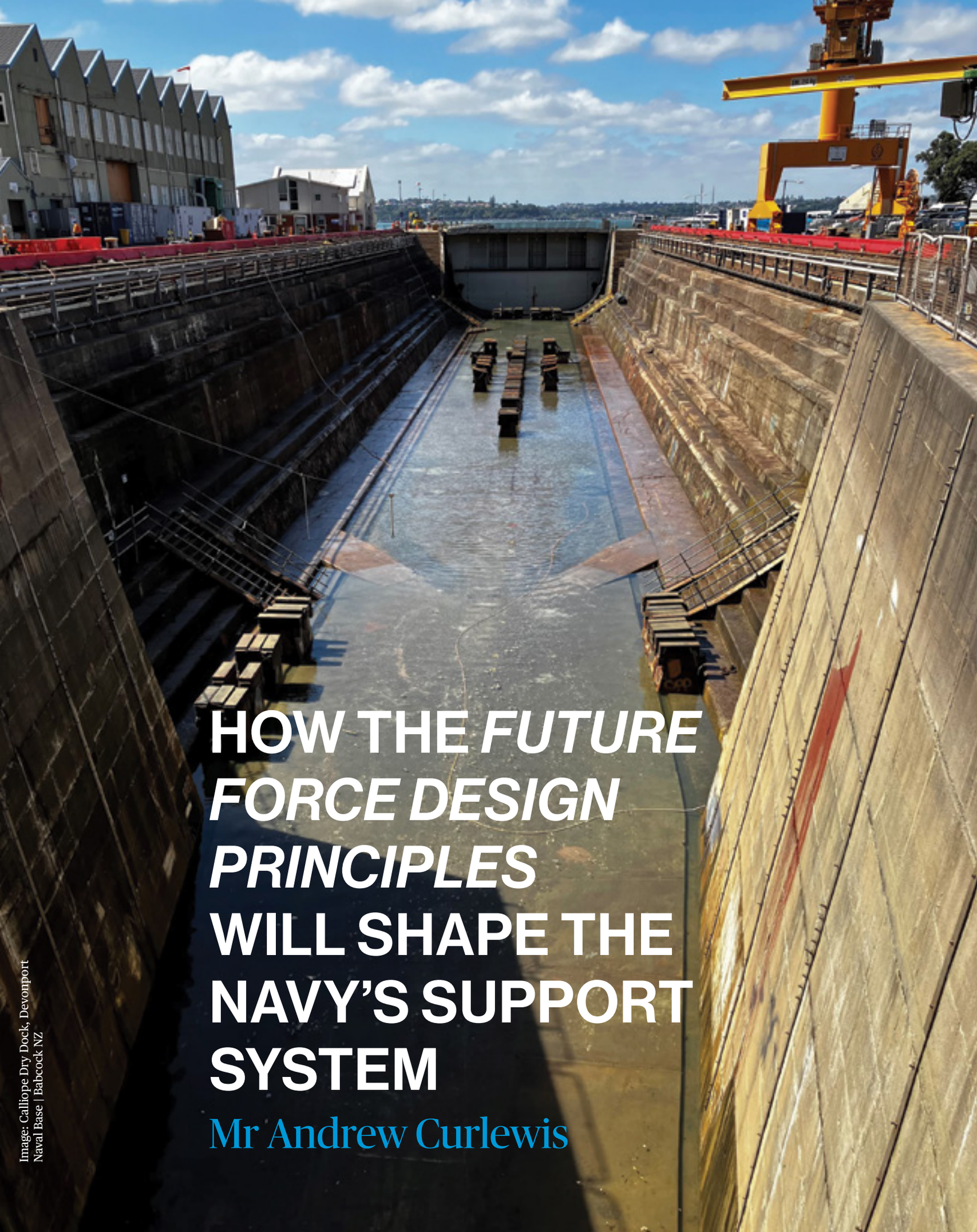
Soare, Simona R., and Fabrice Pothier. "Leading Edge: Key Drivers of Defence Innovation and the Future of Operational Advantage." International Institute for Strategic Studies, London, November 11, 2021.

United Kingdom Ministry of Defence. *Defence Command Paper 23 – Defence's Response to a More Contested and Volatile World*. July 18, 2023. https://assets.publishing.service.gov.uk/media/64b55dd30ea2cb000d15e3fe/Defence_Command_Paper_2023_Defence_s_response_to_a_more_contested_and_volatile_world.pdf

United Kingdom Ministry of Defence. *Data Strategy for Defence – Delivering the Defence Data Framework and Exploiting the Power of Data*. London: 2021. https://www.gov.uk/government/publications/data-strategy-for-defence

VICE ADMIRAL PAUL BENNETT (RTD.), CB, OBE

Joining the Royal Navy in 1985, Vice Admiral Paul Bennett (Rtd.), CB, OBE, commanded the mine hunter HMS *Atherstone* and destroyers HMS *Exeter* and HMS *Daring* before rising to the post of Commander Amphibious Task Group in 2009. Subsequent posts included Commodore Naval Personnel Strategy, Chief of Staff Joint Forces Command, Controller of the Navy, and Commander United Kingdom Maritime Forces. He finished his Navy career as Chief of Staff NATO Allied Command Transformation. He was appointed an officer of the Order of the British Empire in the 2007 and a companion of the Order of the Bath in 2016. Since retiring in 2022, he has taken on a number of roles, notably as a NATO senior mentor. He is also a defence advisor to Systematic, the suppliers of the SitaWare C2 system.



HOW THE *FUTURE FORCE DESIGN PRINCIPLES* WILL SHAPE THE NAVY'S SUPPORT SYSTEM

Mr Andrew Curlewis

Image: Calliope Dry Dock, Devonport Naval Base | Babcock NZ

The importance of support systems to sustain the future RNZN fleet is the theme chosen by Mr Andrew Curlewis, (ex-RN, RNZN, RNZNR Marine Engineering Officer and currently Babcock's Strategic Campaign Director). Guiding the transition from present to future is the New Zealand Government's policy document *Future Force Design Principles 2023*. In his essay, Mr Curlewis sets out the assumptions underpinning the document, then itemises and elaborates its three fixed principles and eight sliding principles. He concludes by noting the rising salience of technology, modularity, professionalism, partnerships (domestic and inter-navy), and operational capacity and availability.

Support systems past, present, and future

Support systems are as old as human movements across the face of the Earth. The Polynesian explorers who transited the Pacific Ocean to the shores of New Zealand devised support systems to ensure that their waka endured the long harsh sea voyages. They mastered the requirements of mending flax sails, checking and replacing ropes, nursing injuries, repairing leaks, and preparing for the ever-present threat of storms. They would have calculated how to stow spare materials for repairs to maintain their waka's optimum performance and ensure they could continue their journey. Europeans did the same at their level of technology during the 18th and 19th century Age of Discovery and Age of Imperialism, and during the military movements of the Great Wars of the 20th century.

In 1888, Calliope Dock was commissioned in Auckland, becoming possibly New Zealand's first major strategic support system asset.[1] For many decades Calliope Dock was a mainstay of the RNZN fleet, used by Navy ships undergoing large-scale maintenance and extended refits. Between these refits, crews were trained and equipped to maintain their vessels and to manage support needs while at sea far from New Zealand's shores.

The ships of today's RNZN require a vast array of supporting systems, networks, and knowledge to ensure they are capable of and available for operations. While remaining an important resource for fleet support, Calliope Dock is less essential than it once was. The current concept of support is currently based on commercial partnerships and extends well beyond the confines of Calliope Dock. The Maritime Enterprise Sustainment Team (MEST) is a collaborative institution in which commercial and military personnel work together to plan, design, budget, procure, manufacture, purchase, and deliver the material support elements required by the ships of the RNZN.

In August 2023, the New Zealand Ministry of Defence released the *Defence Policy and Strategic Statement*[2] together with its *Future Force Design Principles 2023* (FFDP).[3] As NZDF and RNZN leaders consider the shape and size of the future fleet, this essay seeks to understand how the FFDP could shape the future fleet support systems for the RNZN's next generation of vessels.

How will the future support system be defined?

New Zealand's maritime support systems have progressed from the daily maintenance routines of early Māori and Pākehā seafarers to globally recognised maritime maintenance best practices such as ISO 55000 Asset Management Systems.

1 On the historical evolution and adaptive re-alignments of the RNZN see Lieutenant Commander Richard Davies's essay in this volume.
2 New Zealand Ministry of Defence, *Defence Policy and Strategy Statement 2023*.
3 New Zealand Ministry of Defence, *Defence Policy Review: Future Force Design Principles 2023*.

The current support system may be conceptualised in terms of the following four overarching features:[4]

- A "holistic approach" across the RNZN establishment not overly focused on current support networks, systems, and activities.
- The availability of platforms, crews, and logistical needs to future maritime component commanders.
- The assessment of the capability inherent within each platform to deliver the outcomes sought by the government.
- The generation of capability to produce operational effect, the sustainment of capability in the operational theatre, and the recovery of capability to enable operational flexibility and concurrency where asset numbers are minimal.

What is the FFDP?

The FFDP 2023 is a set of aims, principles, and guidelines to inform government decisions on the development of the NZDF over the next 15 years. Within this timeframe, the future shape and composition of the next RNZN fleet will be established. This transition period offers a unique opportunity to redesign not only the composition and capabilities of the vessels of the future RNZN but also the support systems and networks required to deliver the outcomes sought.

The FFDP document sets out four design assumptions, as follows:

1. There is now less time to plan and react.
2. The NZDF will leverage partnerships to deliver outcomes.
3. The NZDF will be prepared for combat.
4. The NZDF will have improved funding certainty.

Further to these assumptions, this essay identifies the following assumptions that are implicit in the future maritime support context:

- Maritime doctrine will not change significantly:
  - ◊ The RNZN will remain a blue water navy.
  - ◊ Operational success will depend on joint integrated forces.
- The future fleet will consist mostly of crewed vessels.

Fixed and sliding principles

Given the above design assumptions, the FFDP document sets out 11 design principles – three fixed principles and eight sliding principles. Each will be examined in this essay from a future RNZN fleet support system perspective.

Fixed Principle 1: A systems approach

Ensuring that all components of capability are considered, that future systems are integrated and that industry is engaged earlier in planning and design.

The approach to the overall support system should consider the holistic integration of various components across all elements, including asset management, supply chain and inventory management, crew training, and operational planning. In doing so, future leaders will be able to identify and address potential risks, such as equipment failures, supply chain disruptions, or shortages in personnel or skills, and thereby enable proactive mitigation strategies to be implemented. By considering interdependencies, a systems approach can optimise the performance of the entire support system.

Fixed Principle 2: Kaitiakitanga

Defence will be guided by kaitiakitanga (guardianship) in responding, adapting, mitigating, and engaging in response to the climate crisis.

New Zealand's area of maritime responsibility is one of the largest in the world, at 4,083,744 km^2. Within this vast region lie an array of vulnerable communities, many at risk of impact by climate change.[5]

4 For an alternative but compatible inventory of four requirements of sustainment see Chris Saxby, "Preparing to Sustain a Modern Frigate-Based Fleet", *Professional Journal of the Royal New Zealand Navy,* 3, no. 1 (October 2022): 64–75. Saxby, a former Royal Navy officer, then Managing Director of Babcock (NZ), recommends a focus on: 1) dock facilities and infrastructure, 2) processes, 3) people and skills, and 4) supply chains.

5 See the essay in this volume by WO Wayne McMillan on the risks of climate change.

Navy personnel make use of a mobile weapons simulator, which provides intelligent assessment of use of the MARS-L rifle.

The future support system will need to take into account how to provide the necessary fleet availability, together with the capability to react to fast-moving demands to meet climate change emergencies both domestic and within our wider Exclusive Economic Zone. Greater understanding of the impact of climate change on sea conditions, including ocean acidification and changes in currents and temperatures, through the wider supporting organisations, such as academia organisations like the National Institute of Water and Atmospheric Research (NIWA), can help in taking future scenarios into consideration when designing vessel support systems to ensure they remain effective and adaptable in changing maritime environments.

The support system itself will need to contribute to efforts to reduce the impact of climate change and may need to support initiatives such as a move to biofuel by future RNZN vessels.[6] Current engine providers, such as MTU, are already building engines with the ability to switch to biofuel. However, modifications to supporting infrastructure will need to be considered to facilitate a partial or full scale move from traditional F76 fuel.

As the support system moves through the 21st century and the threat of rising sea levels becomes ever more pressing, the infrastructure surrounding Calliope Dock will be at risk and mitigation strategies need to be implemented.

Fixed Principle 3: People

People are NZDF's most important capability. A highly professional, well-trained and skilled workforce is critical to achieve NZDF policy objectives.

Well-trained and skilled personnel are essential for maintaining operational effectiveness, and for ensuring that naval vessels can fulfil their missions efficiently and safely in diverse and challenging maritime environments. As future RNZN vessels become increasingly technologically advanced, personnel with high levels of training and expertise will be needed to

6 See the essay in this volume by Lieutenant Isaac Wade on hydrogen fuels.

effectively operate and maintain onboard systems to maximise the capabilities of modern naval platforms. Investing in training and skill development fosters a culture of professionalism, discipline, and pride within the RNZN and its supporting networks. This, in turn, contributes to a higher level of operational readiness and effectiveness across the entire naval force.

Many future sailors and support staff of the next decade are currently in primary and secondary education. Their experience of learning environments and approach to learning is very different from traditional 20th century training environments. Synthetic training environments, allowing a cost effective and realistic alternative to "on-the-job" at sea training, will become the principal means of training delivery for junior sailors and mariners of the future.

Tertiary education providers can help the future support system develop the necessary skills in new and developing technologies such as autonomous vehicles and the use of artificial intelligence (AI) within the maritime context. However, while technological change will drive learning behaviours of the future, some support system skill sets are unlikely to change significantly. Long term investment in trade skills to preserve learnt experiences can provide long and rewarding careers for key tradespersons such as electricians, welders, and painters.

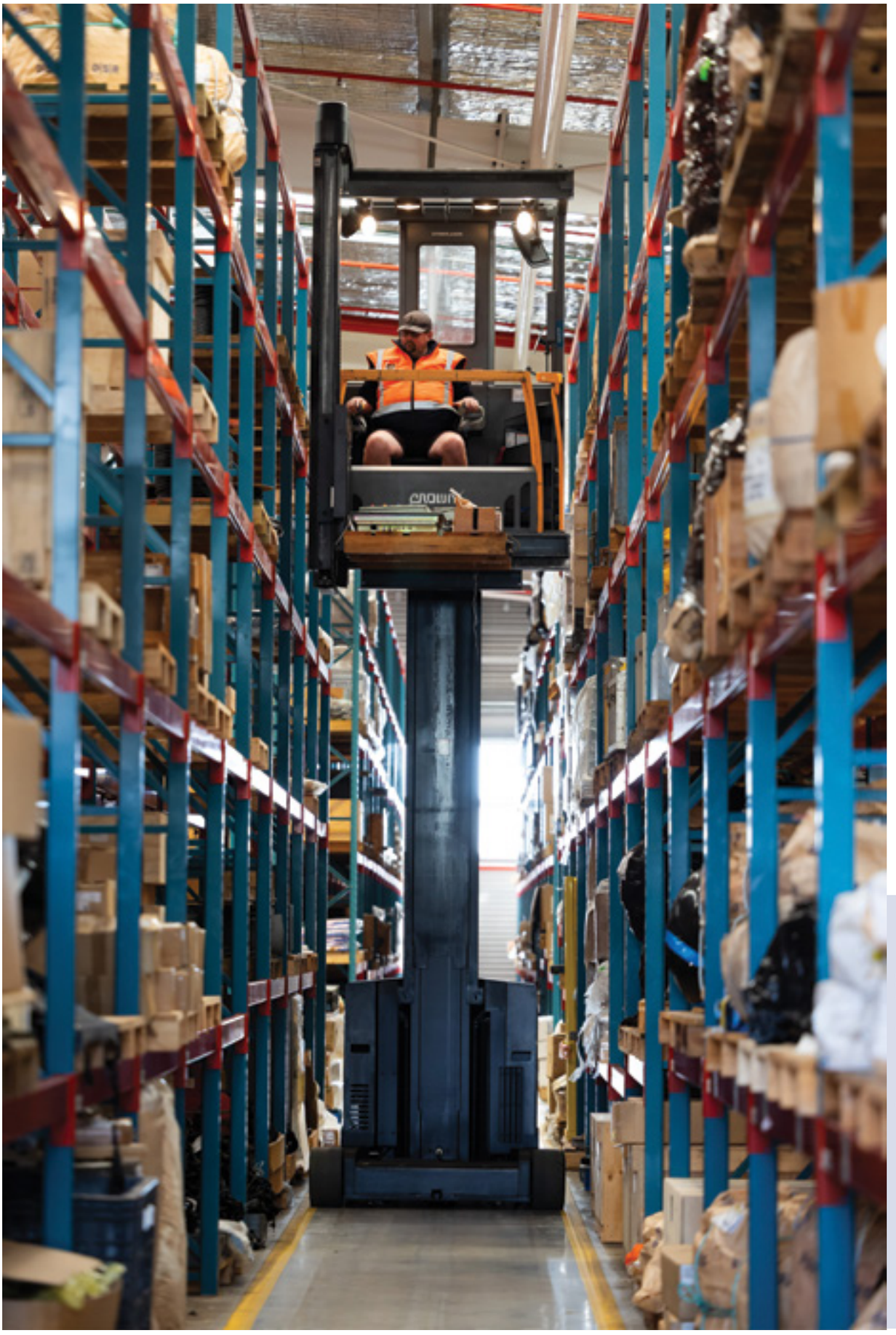
Sliding principles

Sliding Principle 1: Combat capability – Desired policy setting – Medium

The combat capability within the future NZDF will be designed to meet a "medium" principle setting. This could be interpreted within the RNZN context as a Tier 2 combatant. However, within the context of modern military hardware, this level should not be underestimated in terms of its complexity and ability to deliver combat effect. Recent events within the Red Sea area have demonstrated that previously disregarded terrorist organisations increasingly have access to sophisticated military hardware. In protecting the future vessels of the RNZN, future ships are likely to be considerably more combat effective than the current fleet; therefore, several key factors need to be considered for the support of combat capability. Modularity is a concept often referred to when considering future vessels that provides flexibility and cost effectiveness in delivering operational capability.[7] This concept is not new; the current ANZAC fleet was an early adopter of modularity. Depending on the degree of modularity introduced into service, the fleet's supporting systems will need to consider the following:

- Frequency and speed of changes needed for modules to meet operational requirements, and resulting capability variations within the support system required to be able to meet this demand. The Royal Navy used a quick replacement module concept to good effect in its Type 22 class of frigates. The Rolls Royce Tyne gas turbine engines (cruise engines) would generally meet their major service interval at just 5000 hours of use. Platforms were designed to support a quick and efficient removal of these engines through the use of a deployable UK-based support organisation, the Gas Turbine Change Unit, which aims to change an engine within a 72-hour window.
- Similarly, the recent change of the main propulsion engines of HMNZS *Te Kaha* required the removal of the vertical launch system module. This was not a 72-hour exercise. But given the complexity of the module replacement, the associated change-out timeline was acceptable to the operational community. In this example, the removal of modular capability was a much more complex task but acceptable given the 18,000-hour major overhaul interval of the TB93 MTU engines.
- The support system will need to be designed around modularity allowing for easy integration of new technologies, systems, and capabilities as naval combat requirements change over time.
- If containerised multiple mission modules are to be used for the future fleet (e.g., humanitarian assistance and disaster relief [HADR], diving operations, minesweeping, and mine hunting), the support system will need to be designed to preserve, maintain (at high availability), and change out modules in timeframes acceptable to operational requirements.

7 Captain Andrew Watts, RNZNR, made a strong case for modularity in his essay "Designing the Next Fleet" in *Professional Journal of the Royal New Zealand Navy*, 1, no 1 (December 2020): 22–47.



Naval Supply Depot, Devonport Naval Base | Babcock NZ

The Bridge Simulator at the Maritime Warfare Training Centre, Devonport Naval Base

Sliding Principle 2: Concurrency – Desired policy setting – High/Medium

From an operational perspective, this is seen as the ability to operate multiple platforms concurrently across differing operational roles. At the higher end of the scale, concurrency is a key element of the future force design that will present several challenges to the supporting systems of the future RNZN. Compliance with this principle will take into account RNZN's desire to reduce the number of ship classes.

To achieve the desired concurrency, the support system should introduce a high degree of standardisation and interoperability across not only the RNZN's platforms but also, where applicable, partner navies, so as to maximise platform support commonality. Standardising interfaces, protocols, and data formats across different subsystems and platforms promotes interoperability and concurrency by allowing for the seamless integration of disparate systems. This compatibility and interoperability with allied navies and defence systems is crucial for effective joint operations and coalition engagements. The support system should facilitate seamless communication, data sharing, and coordination with partner forces to enhance overall combat effectiveness.

Effective resource allocation and management are essential for supporting concurrency in the development and deployment of the future holistic support system. This would consider common platform-based training to allow a greater degree of inter-ship posting without the need for platform endorsements. Specialist technical expertise, which is deployable with modular capability, will increase maritime commanders' ability to achieve concurrency of operations.

The adoption of modularity to deliver a range of capabilities can greatly assist in delivering both concurrency and fleet availability. Modular-based capabilities can be developed, tested, and deployed independent of the platform's traditional maintenance and upgrade cycles. Therefore, a modular capability once proven, can be deployed into fleet units to meet concurrent operational needs.

Sliding Principle 3: Resilience – Desired policy setting – Medium/High

If history is examined with reference to the RNZN's ability to manage "shock" events, there are a multitude of examples where the RNZN – its personnel and support partners – have delivered, for example, COVID-19, the Christchurch and Kaikōura earthquakes, the White Island eruption, and tropical cyclones Winston in 2016 and Gabrielle in 2023. With the expectation that this trend will continue, and maybe accelerate, support systems will need a high degree of resilience to match platform expectations. A greater degree of commonality within each fleet unit, as well as with partner navies, is a key consideration in enhancing the support system's resilience, because it reduces the risk of single points of failure.

The support system of the future needs to consider a wider support architecture that disperses critical functions and capabilities across multiple locations, reducing vulnerability to localised disruptions or attacks. Calliope Dock and the Devonport Naval Base are both vulnerable to extreme weather events and are, in effect, potential single points of failure. Future considerations should include the continued exploration of alternative national dock capabilities for the future fleet and supplementary facilities for the RNZN outside of the Devonport Peninsula.

Resilient communication networks that are robust against disruptions, jamming, or cyber-attacks will be essential for maintaining connectivity and coordination among naval assets, shore facilities, and command centres. This will require a highly capable, flexible, and adaptable support system across multiple classification domains to ensure the availability is preserved.

Sliding Principle 4: Flexibility – Desired policy setting – Medium

The future fleet is likely to consist of fewer classes of platforms than are deployed today but it is still likely to require the capability inherent in today's fleet. To deliver a flexible capability with fewer classes, several key considerations should be taken into account:

- The adoption of adaptive planning and decision-making processes to support understanding of the availability and limitations of capability of fleet units. By empowering commanders and operators with real-time situational awareness and decision making, the support system enhances flexibility by enabling agile responses to changing circumstances.
- Ensuring interoperability with existing and future naval systems, as well as with allied forces and coalition partners, is essential for maintaining flexibility in joint and multinational operations. Commonality or compatibility of standards, protocols, and communication interfaces enables seamless integration and coordination across diverse platforms and networks.

Current armed conflicts in Europe, and the Middle East have seen rapid development and use of various emerging low-cost technologies to deliver effect. The use of interchangeable interfaces and upgradable components into support systems will facilitate the smooth integration of new technologies, systems, or capabilities over time. This flexibility will ensure the RNZN can leverage advancements in technology and innovation without requiring costly or time-consuming system replacements.

Sliding Principle 5: Scalability – Desired policy setting – Medium

Implementation of flexible resource allocation, such as manpower, budget, equipment, and operational needs, obliges the support system to scale up or down in response to fluctuations in demand, funding constraints, and/or changes in strategic objectives.

Adopting a modular capability architecture will allow the support system to manage the availability of interchangeable

modules or components that can be added or removed as needed. This facilitates scalability, enabling incremental upgrades or expansions to meet changing operational requirements without necessitating large, complex vessel upgrades. To support this further, repair facilities will need to include shore-based support and maintenance of modules to accommodate the various capabilities within each unit.

Scalable information infrastructure, including cloud-based computing, virtualisation, and distributed networks, will enable on-demand provisioning of computing resources to support varying workloads and mission requirements. This will ensure that the support systems can dynamically adjust capabilities to accommodate changing operational demands, without over-provisioning or under-utilising resources.

Sliding Principle 6: Partnership – Desired policy setting – Medium

Partnership is conceived in a holistic perspective across a wide range of relationships on which the NZDF depends to deliver effective outcomes. From a support perspective, an effective partnered approach will consider a wide range of strategic relationships across the support network.

The NZDF have championed this concept in various relationship- and partnership-centred contracts for maritime support, such as the Dockyard Management Contract 2015 and 2018, and the Maritime Fleet Sustainment Contract 2022. These relatively short-term contracts have shown that strong and deep relations within the support environment can deliver effective results over a sustained period of time. If considered over a much longer period of 25 years or more, deeper and more extensive relationships are able to be formed in a wider context.

Traditionally, New Zealand's Tier 2 suppliers have not had the relationship benefits afforded to Tier 1 suppliers and Primes. Long-term sustainment relationship-based contracts allow Tier 1 suppliers to partner and create effective long-term commercial relationships with Tier 2 suppliers, thus enhancing supply chains and overall resilience of the support network.

The same principles can be applied to the training and academic world where the support system relies on the development of the necessary skill sets to match future capability requirements. The provision of modern apprenticeships is as relevant as undergraduate and graduate educational programmes. All contribute to the creation of a dynamic future-embracing workforce.

As discussed earlier, the support system should include secure and interoperable communication channels and information-sharing mechanisms to enable real-time collaboration across diverse platforms and networks. Only then will we have enhanced situational awareness, coordination, and decision-making in joint operations among partner navies. Current mechanisms to recognise industry members' security qualifications, such as Defence Industry Programme Security (DIPS) accreditation, only go so far, and this misalignment of security clearance at the individual level and the need for international trade controls are both areas that need to be developed if support networks for the future are to be as aligned as military partners.

Collaborating on logistics and support functions, such as maintenance, supply chain management, and personnel services will enable deeper interoperability with partner navies and can contribute to the optimisation of resources and enhanced operational efficiency. The support system should facilitate shared logistics and support capabilities, allowing partner forces to leverage common infrastructure, assets, and services to support joint operations.

Sliding Principle 7: Technological approach – Desired policy setting – High/Medium

Within the FFDP document, the adoption of technology is assigned a high priority and furthermore the FFDP suggests that adoption should occur earlier within asset life cycles. The future support system will need to adopt and adapt existing and emerging technological developments to meet operational requirements.

Unmanned vehicles – aerial, surface, and subsurface – will feature as capability

drivers within the future fleet to extend the RNZN's reach, persistence, and flexibility in maritime operations. Advanced sensor technologies, such as radar, sonar, electro-optical systems, robotics, gyro-navigation systems, and the incorporation of AI into defence systems will drive the development of a support system that can readily deploy the appropriate skill sets to ensure these technologies are available for use.

Leveraging data analytics and decision-making support tools enables naval operators to analyse vast amounts of data, extract meaningful insights, and make informed decisions in real time. As the acceptance and adoption of AI into mainstream information technologies gathers pace, it will yield greater ability of support organisations to predict and optimise repair and maintenance activities and to increase the accurate assessment of asset availability.

Enhancements in human–machine interaction through intuitive user interfaces, augmented reality displays, and natural language processing capabilities will likely be key technologies drivers of the future to improve the efficiency, effectiveness, and user experience of naval operators. The support system should prioritise user-centric design principles to optimise human–machine collaboration and facilitate seamless interaction with advanced technological systems.

Protecting naval assets and networks against cyber threats and vulnerabilities is paramount in an increasingly digitised and interconnected environment. Robust cyber-security measures, such as encryption, intrusion detection, and secure communication protocols, need to be incorporated into the future support system to safeguard critical infrastructure and data from ever more frequent and technologically sophisticated cyber-attacks.

Sliding Principle 8: System complexity – Desired policy setting – Medium/Low

Modern naval vessels are inherently complex systems of systems, designed to deliver a multitude of outcomes through a range of capabilities. The future force will aim to lower the fleet's system complexity through platform commonality, allowing the leveraging of new technology, increased partnered focus, and an increase of the concurrency of operations. These are complex and ambitious outcomes, but worth striving for.

Of the three traditional functions of a modern naval vessel – float, move, and fight/operations – the move and operations functions are areas that can offer potential benefits for the support of the fleet. For example, a common engine type or navigation system will allow common crew platform endorsement across ships, which will reduce the overall training burden. It will also simplify the repair, maintenance, and logistics requirements across the fleet. This principle can be applied to many systems across these functional areas and should be an aspirational desire for the future fleet regardless of ship class and ship builder.

Standardising processes and procedures within the support system will promote consistency and reduce overall complexity. By establishing clear guidelines and protocols for system operation, maintenance, and troubleshooting, the support system can streamline workflow and minimise confusion and ambiguity among personnel.

The use of a modular design approach within the future fleet will allow support systems to be composed of discrete, interoperable modules or components. This modular architecture simplifies system integration, maintenance, and upgrades, enabling incremental enhancements without disrupting the entire platform. Furthermore, a greater use of modularity within the future fleet will minimise the reliance on specialised skills or expertise, while also simplifying system operation and maintenance. The support system should be designed to leverage common skills and knowledge among naval and civilian support staff, thereby reducing the need for extensive training or expertise in niche areas.

Conclusions

Historically, a support system has been critical to the success of the mission of any maritime platform. The Future Force Design Principles clearly guide the shape and form of the RNZN's future fleet. However, the principles also provide valuable insights that will inform how the future support systems can complement the needs of that future fleet. Rarely have maritime support systems needed to evolve, anticipate, and innovate at such a rapid pace. In the past, support systems have followed platform development; in future the two must evolve together, with support systems sometimes taking the lead. As the RNZN replaces the majority of its platforms over the next decade, there is a unique opportunity to design a support system that complements the operational needs of our future fleet that is likely to bear little similarity to the current fleet. Support systems put in place over the next decade will be the basis from which the fleet will be supported well into mid-century.

In summary, this examination of the FFDP has revealed key themes that should be considered regarding the future support system:

Firstly, the enabling of strong enduring partnerships across the wide spectrum of the support network: This encourages naval partners, industry partners (both Strategic and Tier 2), and academia to build and develop the workforce of the future.

Secondly, the creation of an environment that allows the rapid adoption of new technologies to enable the capabilities of the future fleet to remain relevant within an ever more rapidly evolving threat environment.

Finally, a focus of the future support system on the Maritime Component Commander's availability of operational capability. With a likely reduced fleet size, the future support system will need to adopt forward thinking, robust and technologically aligned systems to ensure that capability is delivered concurrently, flexibly, and adaptively.

References

New Zealand Ministry of Defence. *Defence Policy and Strategy Statement 2023*, https://www.defence.govt.nz/publications/publication/defence-policy-review-defence-policy-and-strategy-statement-2023

New Zealand Ministry of Defence. *Defence Policy Review: Future Force Design Principles 2023*. https://www.defence.govt.nz/publications/publication/defence-policy-review-future-force-design-principles-2023

MR ANDREW CURLEWIS

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APPLICATIONS OF HYDROGEN TECHNOLOGY TO THE NZDF AND RNZN

Lieutenant Isaac Wade, RNZN

Example portable hydrogen production site, made with Bohemia Interactive Studio, 2013, Arma 3, Version 2.16, using the modification NCS - NZDF MKII by NZDFCrash

In this essay, Lieutenant Isaac Wade, RNZN, presents a case for the application of current commercially available hydrogen fuel technologies to the platforms of the NZDF. He believes that it is feasible to retrofit existing military diesel-powered vehicles and ships with hydrogen dual-fuel systems. He highlights that these systems can increase fuel efficiency, and reduce greenhouse gas emissions, by injecting a hydrogen–air mixture into existing engines. Furthermore, he shows how hydrogen technology could be beneficial to humanitarian assistance and disaster relief (HADR) operations conducted by the RNZN in the Pacific islands. Although the NZDF may face costs and risks, it can learn from the commercial sector, which has already done experimental work, development, and application of hydrogen fuel systems.

Introduction

The phasing out of fossil fuels necessitates the need to move towards other forms of energy storage systems, particularly for vessels, vehicles and aircraft. The theme of this essay is how the NZDF can benefit from hydrogen fuel technology. It starts by noting that containerised hydrogen electrolysers are commercially available and are relatively easy to transport, install, and use. There has also been development of hydrogen diesel dual fuel vehicles allowing for reduced emissions. Furthermore, the commercial maritime industry is already moving towards hydrogen-rich ammonia as a primary fuel source. This is able to be used in existing diesel engines, with some modification, and has the benefit of reduced emissions. Specifically-designed ammonia engines are being produced for new ammonia-fuelled ships.

Considerations for the NZDF

Unfortunately for the NZDF, ammonia contains half the energy density of diesel fuels. This means that if RNZN ships switch to ammonia, they would have only half the range. This is inconsequential for larger ships that have ample fuel capacity, but it is problematic for smaller ships such as frigates and patrol boats. Mixed diesel–ammonia fuel is being investigated by commercial operators. These investigations focus on using ammonia as the primary component and diesel as the secondary component to help with the combustion process. From a RNZN perspective a majority diesel mix with a small quantity of ammonia could help stretch fuel supplies and potentially minimise the losses in performance.

Hydrogen could be an alternative fuel for smaller general aviation aircraft. For larger aircraft, the RNZAF will be obliged to follow civil aviation's initiatives to reduce emissions and raise their investment in synthetic aviation fuels. Investigation and trials of these new fuel technologies would allow for a relatively low-risk introduction of hydrogen technology into the NZDF. It would encourage the development of supporting infrastructure while encouraging a smooth transition to a hydrogen-based Defence Force. It would also provide the NZDF with another option for meeting the New Zealand Government's emission targets.

I recommend that the NZDF undertake investigations into the use of ammonia as a secondary component, using commercial initiatives as a guide. The following discussion attempts to demystify this subject by introducing the technology of hydrogen-based fuels, noting their benefits and risks, and suggesting potential applications across the NZDF.

Hydrogen production

Hydrogen can be produced in many ways. In this essay, we will examine the production of hydrogen through electrolysis, and also through the production of bio-hydrogen, because those are the most applicable to the NZDF.

Electrolysis (Figure 1) is an established, mature hydrogen production technology. For the NZDF, this production technology appears to be the most promising. A production facility can be established anywhere there is a good supply of water,

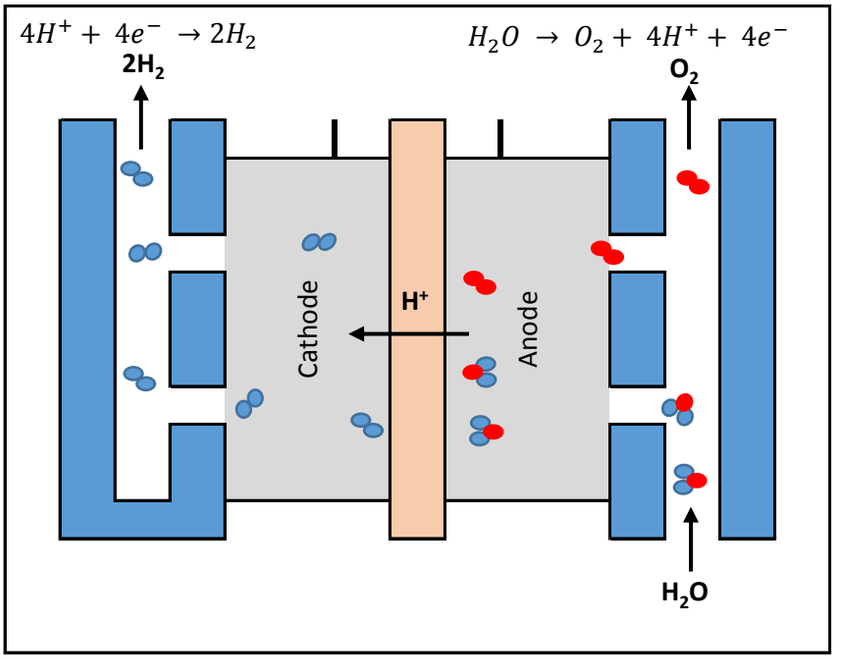

Figure 1 Hydrogen Electrolysis Process

although a means of purifying the water is required. Solar powered production of green hydrogen is sustainable and can be portable.

Electrolysers consist of an anode and a cathode, which are separated by an electrolyte. Different types of electrolysers operate in different ways. Some form hydrogen at the anode while others form it at the cathode. In general, external energy is applied to the system to stimulate the reaction. There are three predominant hydrogen electrolyser technologies: polymer electrolyte membrane electrolysers; alkaline electrolysers; and solid oxide electrolysers. The most common is polymer electrolyte membrane electrolysers.

Biohydrogen

Biohydrogen is the name given to hydrogen that is produced by biological means. Of particular interest to the NZDF is the production of biohydrogen from sewage. Steam reformation of methane gas from the sewage treatment process can be used to produce hydrogen. Alternatively, various microbial species, such as rumen bacteria, can be used in the treatment of sewage. The microbes help break down the waste and release hydrogen. This hydrogen can be captured and stored for use if the process is in a contained system. The use of anaerobic bacteria could allow for the utilisation of such a process on board ships.

Hydrogen storage

Safety and long-term storage are the most important issues with regard to adoption of hydrogen as a fuel. Current technologies are safe and offer various possibilities for storage. The three main storage technologies currently available are: 1) liquid hydrogen storage, 2) gaseous hydrogen storage, and 3) metal hydride hydrogen storage. Each is described below.

1) Liquid hydrogen storage

As indicated by the name, liquid hydrogen storage involves the liquefaction of hydrogen gas. This is achieved through a combination of temperature and pressure. This increases the amount of hydrogen that can be stored in containers of any given volume.

Hydrogen liquefies at -252.9°C. At this temperature, oxygen can condense on pipework and, if not managed correctly, this can pose a risk of explosion. The use of an intermediate cooling medium and proper insulation can significantly reduce this risk, but increases system complexity and maintenance costs. Furthermore, hydrogen liquefaction requires 13 kWh of electricity per kilogram, consuming 30%

of hydrogen's energy potential. Processes under development have the potential to reduce this to 6 kWh. The theoretical maximum efficiency is 3.7 kWh/kg (9.3% of hydrogen's energy potential).

2) Gaseous hydrogen storage

Gaseous hydrogen storage is the most common storage method. It simply involves compressing hydrogen up to approximately 300 bar or greater. This is the simplest and most cost-effective storage method, particularly for use in vehicles as it allows for fast refuelling. The hydrogen is kept under such pressure that if the storage container does suffer a breach, the hydrogen will escape at a speed such that an ideal combustion ratio cannot be reached inside the storage container. This would take the form of a jet of flame from the breach if the vehicle was on fire. But the risk of explosion is lower than that of a petrol or battery electric vehicle.

3) Metal hydride hydrogen storage

Metal hydride hydrogen storage is a developing technology whereby hydrogen molecules are compressed and stored within a metallic hydride lattice. The metal hydride acts like a sponge and can achieve a greater storage ratio by volume than normal gaseous hydrogen storage. To release the hydrogen from the storage vessel, an electrical current must be applied to initiate the process.

The storage of hydrogen atoms in a metal hydride lattice allows for even greater packing efficiency. However, a combination of the lattice and the casing means that a metal hydride hydrogen storage tank weighs 50–150 kg per kilogram of hydrogen stored. Investigations into different materials and composites for use in metal hydride lattices are in progress and, if developed, could yield a comparatively lightweight solution in the future. For example iron oxide has proven to be a stable material for use in metal hydride storage systems.

In comparison with gaseous hydrogen storage, the risk of explosion is significantly lower for metal hydride hydrogen storage. However, some of the materials used in metal hydrides are toxic and others will burn or explode when exposed to air. This means that particular attention needs to be given to the specific material used for the metal hydride lattice.

Applications to the NZDF

With fuel technologies generally trending away from fossil fuels and the current lack of resilience in New Zealand's fuel supply lines, it is important to explore how hydrogen could be used both to decrease carbon emissions and increase resilience. This section explores the potential applications of the discussed technologies, in conjunction with other technologies.

Hydrogen production within the NZDF

With current hydrogen technology, it is possible to establish local hydrogen production facilities at current NZDF locations within New Zealand. Renewable energy can be used to provide the power required in the production of hydrogen. The hydrogen can then be used to power local support machinery, in order to reduce emissions. Future development of hydrogen production technologies could be used to provide mobile production facilities, which could be established in forward support positions or a logistics hub.

Larger bases with their own sewage treatment plants could benefit from the production of biohydrogen or a methane capture system, in combination with steam reformation.

Ships with sewage treatment units that already use microbiological systems could be modified to produce and capture hydrogen. Further investigation and experimentation would need to be conducted to determine how much hydrogen could be produced and whether it would be of sufficient quantity to be viable.

Hydrogen propulsion and power systems

An initial approach for the introduction of hydrogen technologies could be adoption of hydrogen as fuel for NZDF vehicles and ships. Further development could be the production, storage, and use of hydrogen in emergency generators. This move would need to take place in two phases. In the first phase, hydrogen could be used as a mixed fuel alongside diesel to help reduce carbon emissions and to enhance the performance of Defence vehicles. The second phase would be adoption of pure hydrogen fuel cell electric vehicles, as the end goal for use of hydrogen in vehicles.

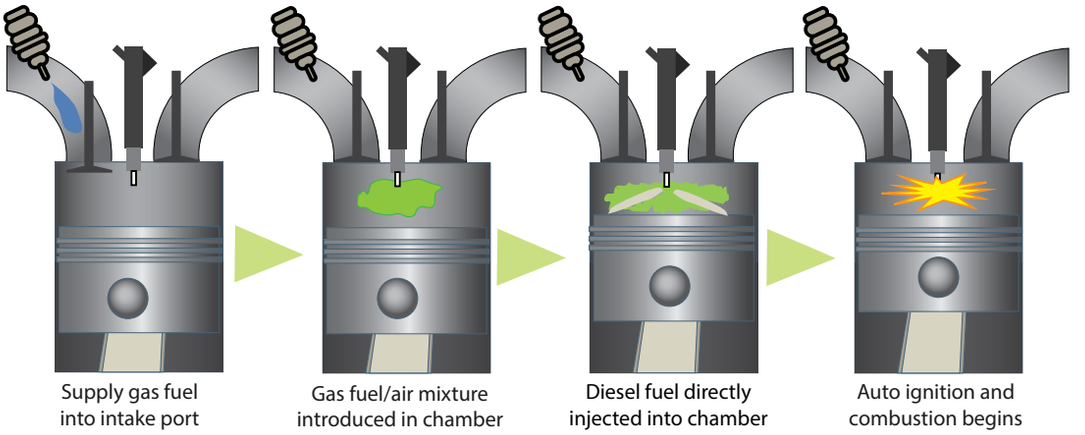

Figure 2 Hydrogen Air mix for Diesel Combustion (based on Taku Tsujimura, 2017)

Hydrogen dual-fuel systems are currently being used by the HW Richardson Group in New Zealand. The HW Richardson Group have added external gaseous hydrogen storage tanks to their heavy vehicles. The general principle is that hydrogen is injected into the air supplying the chamber during the intake stroke of the piston. (See Figure 2).

The hydrogen air mix is compressed and diesel is then injected into the combustion chamber. The ratio of hydrogen to diesel is controlled by a computer, which ensures the engine continues to operate within its designed power and torque limits while reducing emissions. This modification does not preclude the engine from running on diesel alone. The transition from dual-fuel mode to diesel mode is as simple as the flick of a switch.

A team from the University of New South Wales has developed a system that can allow a 90% hydrogen to 10% diesel mix to be operated in a conventional engine. This system works by using a hydrogen injector, paired with the existing diesel injector, to directly inject a mix of hydrogen and diesel into the cylinder for combustion. (See Figure 3).

Feasibility and sequencing

Hydrogen dual-fuel and hydrogen fuel cell electric vehicles are likely to be the most viable method of introducing hydrogen technology to the NZDF. This could start with vehicles used for official business, or for transport on and between military establishments. Introduction to military vehicles could be achieved initially through the modification of support units and, if this proves viable, then combat and field units could be modified. The intent is to increase resilience in the lines of fuel

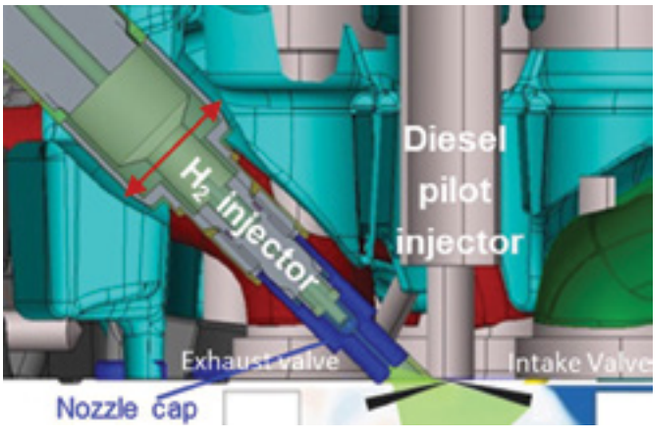

Figure 3 Diesel Hydrogen Dual Fuel Injector (Xinyu Liu, 2022)

supply. However, operating mixed fuel systems carries its own complications, especially with regard to logistics. The dual-fuel approach mitigates this as the vehicles can still operate on diesel alone, if required.

Hydrogen fuel cells operate like a battery. The oxygen enters via the cathode, passes through the electrolyte and reacts with hydrogen at the anode to produce electricity. Hydrogen fuel cells are a proven technology, currently in use in industrial vehicles on an expanding commercial scale around the world. With respect to storage, hydrogen fuel cell electric vehicles tend to use gaseous systems. This is because of the relative simplicity of design and maintenance compared with liquid hydrogen storage.

One of the concerns with using hydrogen as a fuel is that it can cause hydrogen embrittlement within the systems. Vehicles or generators designed to use hydrogen must be designed with this in mind. If hydrogen dual-fuel systems are installed on existing vehicles then it is recommended that some components be changed to stainless steel and be monitored for hydrogen embrittlement.

Hydrogen in a maritime environment

Table 1 details some of the characteristics of different fuel options. Ordinary diesel is included for comparison. Unfortunately, both hydrogen and ammonia have almost half the energy per volume of diesel. However, when adjusted for efficiency, they become comparable. This means that future vessels would need to be designed to facilitate these fuels. On average, internal combustion engines can achieve only 40–50% efficiency whereas electrolysers can achieve upwards of 80% efficiency.

With current technology, hydrogen is a viable fuel for the maritime environment. Already an increasing number of commercial vessels use hydrogen or ammonia as fuel. The most common hydrogen storage, in the maritime environment, is liquid hydrogen. However, this requires increased system complexity for maintenance of storage conditions, presenting a significant risk in the event of a power failure on board. Through a naval lens a bleed-off route has to be designed into the structure of the vessel to reduce the risk of damage resulting from storage tank rupture in the event of combat damage or prolonged power failure. Also, the tanks need to be designed to accommodate the boil-off of hydrogen during long voyages, although the boil-off can be captured and re-liquified. Metal hydride storage solutions are viable for storing hydrogen for maritime applications, but the technology is very heavy. The German Type 212a submarine uses metal hydride storage, with the additional weight being advantageous to its design.[1] Hydrogen is not the class's primary drive system but is an augmentation of capability in addition to the primary diesel–electric system.[2] Nevertheless the German submarine example shows that, with further development, the technology has potential.

Ammonia (a hydrogen carrier), appears to be, at present, the fuel of choice for civilian maritime use, and this may be applicable to navies in due course. Two storage options exist for ammonia; they are compressed gas storage up to 10 bar and liquid storage. Compressed ammonia storage presents a greater risk than compressed hydrogen, because the lower storage pressure means that if there is a breach in the storage container and it is exposed to flame, an explosion could occur. Liquid ammonia storage requires cooling to -33°C. Boil-off is not as much of a concern as it is with hydrogen and the energy requirements to maintain the temperature are much lower. The major concern with the use of ammonia is that it is extremely toxic. Additional precautions would need to be taken in the handling and management of ammonia. Future vessels are likely to be designed with ammonia fuel in mind, potentially leading to the adoption of ammonia as a primary fuel.

Industry researchers have been investigating the use of ammonia–diesel mixes in conventional diesel engines. This research has been predominantly focussed on a greater ratio of ammonia to diesel. There is a lack of information with regard to using a lower ratio of ammonia to diesel as a means of maintaining energy output while minimising emissions. This is another avenue of interest for the NZDF.

The combustion of ammonia can yield various by-products depending on the amount of oxygen present during the reaction. When the oxygen presence is low, nitrogen is produced. This is not a

1 Klopčič et al, "A Review on Metal Hydride Materials for Hydrogen Storage".

2 Saeger, "German Submarine Technology".

Table 1 Energy Potential of Alternative Fuels

Fuel	Density (kg/m^3)	Specific energy (MJ/kg)	Energy/ volume (MJ/L)	Storage temp. (°C)	Efficiency (%)	Energy/volume adjusted (MJ/L)
Diesel	880	45	33.7	20	40	13.48
H_2 gas (300 bar)	20	142	2.84	20	80	2.27
H_2 gas (700 bar)	40	142	5.68	20	80	4.54
H_2 liquid	70.9	142	10.07	-143	80	8.06
H_2 metal hydride	115	142	16.33	20	80	13.06
Ammonia gas (10 bar)	7.07	22	14	20	40	5.60
Ammonia liquid	696	22	15.6	-33	40	6.24

problem as nitrogen already makes up approximately 78% of the air we breathe. But at rising levels of oxygen, nitrogen oxide and dioxide are produced. Nitrogen oxide (NO_X) compounds are greenhouse gases, significantly worse than carbon dioxide.[3] However, nitrogen oxides can potentially be reduced or contained by various methods. Nitrogen oxide could be fed back through the combustion process to form nitrogen dioxide, which could then be captured.[4] The nitrogen oxides could be reacted with ozone (O_3) to produce nitrogen and oxygen.[5] There are myriad different technologies that have been developed, and are in development, to solve the nitrogen oxide problem.

Another option is to investigate the use of hydrogen produced on board in the combustion process. This would be dependent on the quantity of hydrogen that can be produced on board, which is likely to be insufficient for use in the main engines, but could be sufficient for use in boats such as Rigid Hull Inflatable Boats. The other consideration is the impact on gas turbines using ammonia or hydrogen dual fuel. Given that gas turbines are prominently used in aviation, and the low energy density of ammonia, there is little research in this field. Hydrogen gas turbines have been developed so there is potential in investigating the feasibility from a maritime perspective. Another benefit to the use of ammonia is that it is produced by most countries around the world and is readily available.

Hydrogen for aviation

Civilian aviation is moving towards using hydrogen to produce synthetic aviation fuel. Hydrogen is being explored for short to medium distance. Current hydrogen technologies are not efficient over long distances. Owing to the difficulty in managing the compression of hydrogen in relation to the external atmospheric pressures of an aircraft at changing altitudes. Liquid hydrogen storage is promising for shorter flights, but for longer distance flights the equipment required to maintain the liquid state of the hydrogen storage is too heavy to be practicable. Metal hydride hydrogen storage is also currently impractical, due to its weight.

Hydrogen could be used as fuel in helicopters, light aircraft and unmanned aerial vehicles (UAVs). If a hydrogen production facility was established at a forward support position, this would allow aircraft to be refuelled. This would give aircraft greater range and capability. It could be possible to retrofit some of the existing airframes with dual-fuel systems, but a cost benefit analysis would need to be undertaken to determine if the additional weight and design changes were worth

3 Lammel and Grabl, "Greenhouse Effect of NO_x".
4 Ishvie et al., "Absorption of Nitrogen Dioxide by Soda Lime".
5 Sadeghbeigi, *Fluid Catalytic Handbook*.

implementing. Future airframes could, and are likely to be, designed with hydrogen in mind.

The larger aircraft of the RNZAF will likely follow civilian aviation in its emission reduction plans. This would likely take the form of hydrogen production facilities at or near to RNZAF bases, feeding a synthetic aviation fuel production facility. Particular attention to, or even direct involvement with, the New Zealand Hydrogen Consortium and its efforts to introduce hydrogen powered aircraft to New Zealand, should be considered.

Hydrogen for humanitarian assistance and disaster relief (HADR)

To illustrate what a hydrogen-based Defence Force might look like, this section explores a HADR scenario. Imagine that a natural disaster has taken place on an island in the Pacific, and RNZN ships have been dispatched to respond. *En route* to the island, the ships produce hydrogen, which is used to reduce ship emissions. When the ships arrive, units are deployed to establish hydrogen production via a deployable containerised system, powered by renewable energy. The oxygen produced by the hydrogen electrolyser is used to supplement the medical stock bought with the units, and the remainder is distributed to local medical facilities.

The deployable hydrogen production system would include at least one 20-foot containerised 1.1 MW electrolyser, one or more 20-foot storage and refuelling container/s, and a rapidly deployable 2,023 m^2 solar power plant (approximately the size of half a rugby field, based on 2 m^2 solar panels). Assuming there are six hours of viable solar potential in a day, this would produce 112 kg/day of hydrogen. If the system was supplemented by portable wind turbines, portable hydro-electric, or other renewable energy technologies, higher production could be achieved, depending on the location of the island. Water could be supplied from rivers, streams, or the sea; however, the use of salt water would reduce the electrolyser's average fresh-water service life of 10–15 years. The effectiveness of generating electricity from solar would be severely impacted by a volcanic event, and, given the Pacific setting, portable wind and tidal energy generation may not be feasible, dependant on the island's proximity to the jet stream and tidal flows.

Hydrogen fuel cell backup generators could also be deployed to ensure that critical systems can remain powered. Depending on the size and complexity of the operating base, additional hydrogen production may be required. The hydrogen production system and storage could be modular so that, depending on the needs of the operation, larger or smaller systems could be deployed. The major limiting factor would be space and water supply.

Vehicles deployed to this hypothetical island could use either dual-fuel or pure hydrogen systems, allowing them to operate using the locally produced hydrogen. Regarding pure hydrogen fuel cell electric vehicles, light vehicles can store 5–6 kg of hydrogen and use 2.6 kg/100 km, whereas a commercial hydrogen truck has a capacity of 32 kg and uses 8.02 kg/100 km. Upgraded military vehicles with dual-fuel systems will likely operate within this range. Exact figures are dependent on the type of system used and the hydrogen-to-diesel ratio used. Thus 112 kg of hydrogen could support three fully loaded freight trucks travelling 400 km each day, or 22 smaller vehicles travelling 190 km each day. If dual-fuel systems are used, this would prolong the stocks of both the diesel and hydrogen.

Once the operating base has been established and hydrogen production is operational, helicopters from the ships could be stationed at the operating base to provide further assistance. This would free up the ships to obtain additional supplies or undertake other tasks. The deployed unit, from a fuel perspective, can be self-sufficient for an extended period.

When the relief effort has completed its objectives, the operating base can be packed up and made ready for a future deployment elsewhere, with operators, local communities and host nation, benefitting from the experience gained. Another option is that a permanent hydrogen production and storage system could be established by bedding down the deployable system, in order to increase the resilience of critical infrastructure in the area. This would provide prolonged benefits to the local communities.

Conclusion

Following the impetus provided by global warming concerns, progress with respect to hydrogen technology has been rapid and continues to evolve. Hydrogen technology, particularly hydrogen–diesel mixes, provides an opportunity for the NZDF to increase the resilience of its fuel supply chains. However, the price rises as the supply chain grows more complex. Nevertheless, civilian use of alternative technologies for transport and shipping is increasing, along with its attendant development of production and logistics, and the NZDF can learn from these initiatives and adapt them as appropriate.

With current technology, it is feasible to begin developing a hydrogen-based Defence Force through the implementation of hydrogen production facilities and dual-fuel systems for existing vehicles. A gradual test and expansion of a hydrogen system could be implemented, initially with local vehicles, and could be then expanded to the field. Future development of the technology and future military assets could be built around the use of hydrogen as a fuel.

The development and design of the next generation of naval vessels will likely be forced by maritime regulations into using hydrogen-based fuels. It is important that planning for this requirement begins now, in order to guide these developments in policy and technology. Though pure hydrogen-powered vessels are unlikely to be viable in the near future, it is possible that the use of an ammonia–diesel dual fuel could provide a viable alternative as well as increased resilience in supply.

For commercial aviation, and military air forces, larger airframes are unlikely to use hydrogen directly as a fuel at this stage, but the production of hydrogen will assist in the production of synthetic aviation fuels. This is especially important as civil aviation moves towards synthetic fuels to reduce their environmental impact. Military aviation should follow. As for smaller aircraft, such as military helicopters and drones, it is now possible for them to operate using hydrogen. How this could affect capability and strategy needs to be considered when weighing up the benefits of hydrogen technology.

Safety is always a consideration when investigating and adopting new technologies. Depending on the scale and type of technology, hydrogen fuels can vary from safer than current fuels (gaseous hydrogen storage) to introducing new hazards and risks, for example around liquid hydrogen storage.

This essay recommends further research into:

- production of hydrogen on ships;
- use of diesel–ammonia dual fuel for RNZN vessels;
- acquisition of portable hydrogen production and storage systems by the NZDF logistics system; and
- gradual conversion of vehicles to hydrogen dual-fuel systems.

Embracing hydrogen would also help the NZDF to demonstrate a commitment to achieve the New Zealand Government's emissions targets and reduce the carbon impact of operations, both at home and abroad.

References

Ishvie, T., T. Sato, T. Hayashi, N. Kato, and T. Hata. “Absorption of Nitrogen Dioxide and Nitric Oxide by Soda Lime.” *British Journal of Anaesthesia* 75, no. 3 (1995): 330–333.

Klopčič, Nejc, Ilena Grimmer, Franz Winkler, Markus Sartory, and Alexander Trattner. “A Review on Metal Hydride Materials for Hydrogen Storage.” *Journal of Energy Storage* 72, part B (November 20, 2023): 108456.

Lammel, Gerhard, and Hartmut Grabl. “Greenhouse Effect of NOx.” *Environmental Science and Pollution Research* 2, no. 1 (1995): 40–45.

Liu, Xinyu, Gabrielle Seberry, Sanghoon Kook, Qing Nian Chan, and Evatt R. Hawkes. “Direct Injection of Hydrogen Main Fuel and Diesel Pilot Fuel in a Retrofitted Single-Cylinder Compression Ignition Engine.” *International Journal of Hydrogen Energy* 47, no. 84 (October 5, 2022): 35864–35876.

Sadeghbeigi, Reza. “Emissions.” In *Fluid Catalytic Handbook: Practical Operation, Design, and Optimization*, 281–296. Oxford: Butterworth-Heinemann, 2020.

Saeger, Hans. “German Submarine Technology”. *The Submarine Review* (October 1996): 61–72. https://archive.navalsubleague.org/1996/german-submarine-technology

Tsujimura, Taku, and Yasumasa Suzuji. “The Utilization of Hydrogen in Hydrogen/Diesel Dual Fuel Engine.” *International Journal of Hydrogen Energy* 42, no. 19 (May 11, 2017): 14019–14029.

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BUILDING RNZN COASTAL SURVEILLANCE CAPABILITIES: LESSONS FROM THE COASTWATCHERS

Mr Michael Vredenburg

John Sorensen, a coastwatcher, and Tulagi, one of a small group of young men from Niue employed by the New Zealand Government to assist the coastwatchers in the Kermadec Islands. They appear to have just returned to their base at Boat Cove, Raoul Island, from a hunting expedition in 1944. Credit: Alexander Turnball Library, Sorensen, John Herman, 1905-1982, 1/4-113609-F

Given budgetary and capacity constraints but facing intensifying challenges in the Pacific islands and maritime Southeast Asia, the NZDF should learn from the Second World War (WWII) Coastwatchers. NZDF civilian maritime specialist Michael Vredenburg reviews the contributions made to the Allied war effort by the Coastwatchers and notes that they were an economical force multiplier. He suggests that recruiting a similar network of partners throughout the Indo-Pacific region could enhance New Zealand's intelligence and information warfare capacity at relatively little expense. The Naval Reserve's Maritime Trade Operations (MTO) branch would have a central role to play.

The New Zealand Defence Force's problem

The NZDF does not have a permanent operational presence at the unit level in its strategic areas of interest, the Pacific islands and maritime Southeast Asia. The last such forward-deployed unit, 1st Battalion Royal New Zealand Infantry Regiment (1RNZIR),[1] departed Singapore in 1989. Since then, NZDF units and personnel have deployed temporarily on exercises to various countries in the region, and on limited duration coalition, contingency, security, and humanitarian assistance operations to nations such as Timor Leste, the Solomon Islands, Fiji, and Tonga. Individuals serve as defence attachés, advisers and logisticians in certain Pacific island and Southeast Asia countries.[2,3] Meanwhile, New Zealand's recently-released *Defence Policy and Strategy Statement 2023* acknowledges that our country is faced with a 'deteriorating strategic environment' marked by 'strategic competition' and calls for the government to act through 'increasing our presence... in the Pacific'.[4]

Towards a solution

This article proposes the establishment of a NZDF maritime surveillance programme with three broad outputs:

1. A small unit staffed primarily with RNZN personnel would deploy to various Pacific island countries and maritime Southeast Asia to establish and maintain coastal surveillance networks with regional partners and proxies.
2. The roles of personnel currently assigned as overseas advisers and attachés would be expanded to include additional maritime surveillance tasks.
3. Technical capabilities would be created, tested, and implemented using new systems to support maritime surveillance and the intelligence cycle.

This new capability umbrella would be a direct reflection of the experiences of Second World War Australian and New Zealand Coastwatcher organisations in partnering with local networks and working across warfare domains with other organisations. It would also possess some characteristics of recently-formed units in our partners' militaries as models[5] for the

1 New Zealand Government, "New Zealand Military Base in Singapore".

2 New Zealand Government "Deployments".

3 In addition to various defence attaches posted to high commissions and embassies, there are NZDF personnel assigned on an individual basis to Papua New Guinea, Singapore, the Cook Islands, Vanuatu, Fiji, Tonga, and to the Pacific Islands Forum Fisheries Agency in Honiara.

4 New Zealand Government, *Defence Policy and Strategy Statement 2023*.

5 Influences for this concept may also be found in WW II organisations such as the British multiservice 30 Commando, Special Operations Executive, and Combined Operations Pilotage Parties (COPP). Modern examples for such a capability, albeit on much larger scales, include: US Marine Expeditionary Force Information Groups (MIG), UK Royal Marine 30 Commando Information Exploitation (IX) Group, British Army 77th Brigade, and US Naval Special Warfare Group 8 (NSWG 8).

combination of intelligence, surveillance, reconnaissance, influencing, engagement, communications, and cyber operations under a single command.

The NZDF coastal surveillance role in peacetime would help to:

- ensure the security of regional maritime transport and undersea communications;
- provide in-situ maritime security support and assistance to host nation authorities; and
- contribute to maritime intelligence collection and analysis.

Members of the unit would be trained to conduct intelligence, surveillance, target acquisition, and reconnaissance (ISTAR) activities independently, as well as in coordination with other NZDF units. Personnel would support shaping and maintenance of local networks for collection activities in support of New Zealand combat operations, and would therefore carry out some functions of the larger NZDF information warfare (IW) enterprise. The Ministry of Defence and NZDF would work with the Ministry of Foreign Affairs and Trade and regional host nation governments to consider how additional deployments would be undertaken by either implementing new, or updating existing, status of forces agreements.

Establishing this modest capability is not a solution for New Zealand's many defence challenges, nor would it be a substitute for developing other capacities across the three Services. However, it would be a step towards New Zealand's closer engagement with regional partners and allies. It would also add to the NZDF's options in a critical part of the world, at a time when our partners and adversaries are also refining and updating their own maritime doctrine and plans. This capability and activity would signal that New Zealand can undertake surveillance operations across the conflict spectrum. A unit such as this would be imbued with a combat mindset. It would be able to operate within an adversary's engagement zone and in the vanguard or in rear areas of other NZDF units, to monitor, screen, and support the delivery of kinetic and non-kinetic effects. This capability borrows from the legacy of the WWII Coastwatcher organisations, especially the relationships that were built with proxy forces.

The precedent set by the coastwatchers

In the early days of the war in the Pacific, the most important Allied information collection activity was the Australian Coastwatcher organisation, which came under the control and supervision of the Allied Intelligence Bureau (AIB) Australia.[6] From the start of the WWII until 1943, the AIB was organised in four separate departments:

- "A", which carried out special reconnaissance, commando, and sabotage missions;
- "B", which was responsible for intelligence analysis;
- "C", the Coastwatcher organisation; and
- "D", (the Far East Liaison Office [FELO]), which conducted propaganda campaigns, developed and fielded special equipment, and ran covert agent networks in enemy-controlled areas.[7]

New Zealanders operated as coastwatchers, analysts, communicators, and commandos within the larger intelligence, surveillance, and reconnaissance (ISR) networks run by AIB. However, New Zealand also had its own coastwatcher organisation, operated by the New Zealand Naval Board with wartime liaison and coordination with the Allies through AIB. Beginning in 1929, coastwatchers were posted to islands throughout New Zealand's strategic sphere of influence and astride its critical sea lines of communication (SLOC), which stretched from the Gilbert and Ellice Islands, along the equator in Micronesia, to as far south as the sub-Antarctic. The New Zealand wartime coastwatcher enterprise also included a modest fleet of merchant ships and local small craft, pressed into service to conduct maritime reconnaissance and surveillance, carry personnel, and transport supplies. Coastwatching networks provided security and enabled New Zealand to work effectively in the areas of the Pacific where it could best leverage its influence and experience.[8]

The information provided by coastwatchers from deep within enemy territory was essential to the Allied effort in the South

6 Van Liew, "The Coastwatchers: Intelligence Lessons Learned for the Future Single Naval Battle".
7 Bigelow, "Allied Intelligence Bureau Plays Role in WWII".
8 Gillespie, *The Official History of New Zealand in the Second World War,* 230.

Pacific theatre. As Allied forces advanced through the islands, the coastwatchers also served as both front line and rear area reconnaissance screens, protecting the movement of friendly forces while observing and disrupting enemy activity and maintaining relationships with local islanders. Some of the core capabilities needed today by NZDF existed in the AIB's structure and operations during WWII, including local partner engagement and influencing, intelligence gathering, and irregular warfare.[9] It would have been impossible for WWII coastwatchers to carry out their missions if they had not already been in place, building networks, establishing relationships, and becoming familiar with the operating environment, well before war broke out. The lessons learned from the war become even more important for contemporary operations in littoral areas, where population growth and technology have added to the complexities of both peacetime and wartime maritime operations. Proactive, multi-domain intelligence collection by coastal surveillance networks that are in place before the outbreak of hostilities, will once again be essential for NZDF operations in the Indo-Pacific region.[10]

The Pacific island context

The islands and archipelagos of the Pacific and maritime Southeast Asia form part of the world's most strategic geography. They are a focus of the Australian and New Zealand governments and are areas in which the sea, air, and land forces of both countries would need to operate in a conflict.[11] A challenge for New Zealand is scaling its participation relative to its capacity to contribute to these security and defence partnerships. One option would be to include coastal surveillance teams as contributions to existing regional security frameworks, such as the Royal Australian Navy (RAN) Pacific Maritime Security Programme (PMSP). NZDF could "plug in" to such existing programmes, adapt within resource constraints, and sustainably increase its participation. Coastal surveillance, intelligence collection and environmental shaping in the region would support wider NZDF efforts to improve its ability to operate in the Pacific islands.[12] It would also help maintain New Zealand's relative advantages in the current steady state of competition, short of armed conflict. NZDF must seek additional options for regional security in order to meet the government's commitments, and upgrade its posture while being realistic about resource limitations.[13]

The trust New Zealand enjoys among its Pacific island partners is a strategic advantage not always held by other regional and global powers, including Australia and the United States. Soft power built on trust allows New Zealand to wield influence out of proportion to its economic strength, and makes up for some of the resource deficit that materially restricts New Zealand in comparison to its wealthier and larger security partners.[14] New Zealand's government considers regional security in the countries of the Pacific islands and Southeast Asia to be the main driver of our international relationships and engagement,[15] and aligns its policies for cooperation, engagement, and monitoring in the Pacific with the provisions of the Pacific Islands Forum's Boe Declaration.[16] New Zealand and Australia are supplementing their traditional soft power contributions to gain influence and access in the Indo-Pacific with increased military cooperation and presence, which is indicative of the asymmetric nature of competition in the region.[17] New Zealand is refocusing its elements of national power in the Pacific islands and Southeast Asia in line with its philosophy and policies for mutual support, engagement, consultation, and equity in its foreign affairs and security relationships.

9 Irwin and Wilson, *The Fourth Age of SOF: The Use and Utility of Special Operations Forces in a New Age*, 48.
10 Van Liew, "Making Maritime Reconnaissance and Counterreconnaissance Relevant".
11 Dean and Brown, "Littoral Warfare in the Indo-Pacific".
12 Boswell, "The Land Component in the Maritime Domain", 50.
13 New Zealand Government, "*Advancing Pacific Partnerships: A Framework for Defence's Approach to the Pacific*", 5.
14 Powles, "Identity, National Security, and Influence: The Pacific 'Reset' and Shaping New Zealand's Relations with the Pacific Islands", 35.
15 New Zealand Government, Ministry of Foreign Affairs and Trade, 2023.
16 Pacific Islands Forum, "Boe Declaration". 2018.
17 Powles and Wallis, "Shouldering Their Fair Share?"

Partnerships and personal relationships in the Pacific islands are key to Australia's and New Zealand's defence and security policies for the region.[18] The establishment of a coastwatcher presence in the Indo-Pacific, as proposed here, would be minimal in cost compared to RNZN ship deployments, which are the traditional features of naval diplomacy[19], but they would still yield benefits. Persistent surveillance deters adversaries from taking belligerent or destabilising actions in peacetime within New Zealand's strategic sphere of interest. Therefore, detecting and reporting such activities when they occur is to New Zealand's advantage.[20] Effective defence diplomacy is characterised by "soft power" elements. Although troop deployments, large exercises, and ship visits may be visible and effective means of achieving diplomatic defence goals, partner capacity-building, small-scale relationship-building, and light-footprint presence can also be highly effective, and in many cases, are more desirable.[21]

New Zealand's main adversary and its most likely foe in an armed conflict in the Indo-Pacific region employs coercion, threats, and other unwelcome behaviours, known as "grey-zone activities" to destabilise the existing order.[22] Grey-zone activity is political and economic warfare in which all necessary elements of national power are brought to bear in order to achieve a nation's objectives, short of armed conflict, and include overt, discreet, and covert

18 Australian Government, *Defence Engagement in the Pacific*, 3.
19 Widen, "Naval Diplomacy – A Theoretical Approach", 718.
20 Layton, *China's Enduring Grey-Zone Challenge*, 81.
21 Roddis and Tan. "Defence Diplomacy".
22 Bradley, "We Can't Stand Aside and Say Nothing to See Here".

Royal New Zealand Navy personnel pay their respects to the work of the Second World War coastwatchers, as the first Cook Island coastwatchers' plaque is unveiled at O'Neill's Point Cemetery on Auckland's North Shore.
Pictured from left are POCWS Teatareva Isaia, WOCWS Darren Crosby, LSCS Fineogo Leameivaka, AMUS William Filimoehala (bugler), CPOSCS Andrew Fleck, POWTR Victoria Amosa, WOSCS Mark Latu, CDR Martin Broederlow, CPOMAA Lino Kurene, OEWS Molly Tamale and POSCS Thomas Katu. Date: 16 September 2023

measures.[23] Asymmetric operations are a component of a long-term strategy to destabilise the existing rules-based order in the Indo-Pacific region. The timeline for the adversary's campaign will be measured in years, although its manipulation, deception, coercion, and disinformation activities in the Indo-Pacific maritime operating environment now occur on a daily basis.[24]

The physical environment

The physical environment of the Pacific islands and Southeast Asia requires planners and policy makers to consider the nature of maritime trade, climate, data, resources, and marine transport in the region. Commercial shipping services are economically fragile and subject to disruption even in the best of economic times;[25] and in wartime they become critical. Shipping routes from New Zealand and Australia, through the islands and archipelagos of the Pacific onward to the West Coast of the United States and to East Asia, form strategic SLOC that require constant surveillance in wartime, and active monitoring in times of increased competition and friction. The immensity of the maritime environment can hinder remote sensors, especially when trying to identify specific ships and other potential targets amid the clutter of civilian activity in coastal areas.[26] Illegal, unreported, and unregulated (IUU) fishing is difficult to detect amongst the littoral clutter in peacetime and even more so in wartime, as maritime units would be required to apply the international humanitarian law principle of distinction when searching for enemy targets at sea.

Ashore, urban areas in the islands are clustered around regional ports and their populations continue to grow. The coastal terrain of the Pacific islands and maritime Southeast Asia is not as sparsely populated and undeveloped as it was in WWII. Major cities and towns dot every coastline, connected by modern shipping and telecommunications. Littoral operations in a future armed conflict will take place in and around these population centres,[27] which also contain the major ports and airports of the region. The advent of modern communications technology has resulted in islands and populations becoming connected by internet and cellular networks, which makes it quite simple for coastal surveillance networks to report ship movements.

The undersea environment presents a new theatre in asymmetric, irregular, and maritime information warfare. Control of undersea networks can establish information dominance over island and archipelagic states. As an example of risk, subsea cables in the region not only connect New Zealand to North America and Asia, they also branch off to various Pacific islands themselves, carrying almost all of the data each Pacific island country needs to maintain networks for communications, health care, energy distribution, commerce, finance and banking, diplomacy, and security. In peacetime, these cables are susceptible to damage from innocent and inadvertent anchoring, dragging, dredging, and grounding. Subsea data cables are easy to damage or destroy and are obvious targets even in peacetime. They would certainly be targeted for interference, sabotage, and destruction in an international armed conflict. It is not unreasonable to suspect that a prelude to open armed conflict would include such disruptive operations, aimed at shutting down communications and creating an information blackout to sow confusion and panic. Detection of unusual or abnormal maritime activity is important, not only to maintain a posture of presence and deterrence, but also for counteraction, planning, and shaping. On-site personnel with specialist knowledge of maritime patterns of life would be best suited to detect anomalies, assess them, and pass information along to planners and decision-makers.[28]

The archipelagos and islands in the Indo-Pacific, with their many passes and straits, serve to channelise ship movements, creating choke points to be avoided or exploited, depending on which force

23 Votel et al., "Unconventional Warfare in the Gray Zone", 102.
24 Guinto. "South China Sea: Biden Says US Will Defend the Philippines if China Attacks".
25 Asian Development Bank (ADB), *Oceanic Voyages: Shipping in the Pacific,* 5.
26 United States Government, *Joint Publication 3-32 Joint Maritime Operations,* 1-6.
27 Anspach, *Warfighting in Urbanized Coastal Terrain*, 1.
28 Osekowska. Design and Implementation of a Maritime Traffic Modeling and Anomaly Detection Method, 5.

can establish control or at least maintain observation of these areas.[29] Protracted littoral campaigns require the security and integrity of interior coastal lines of communication. The ports, waterways, and passages upon which military forces depend for logistics must be secured and maintained even after combat operations have moved onto other areas. Securing ports allows forces to establish rear areas and build up for the follow-on phases of a campaign. The same is true for peacetime operations in the littoral; NZDF humanitarian assistance and disaster response (HADR) following a cyclone or tsunami also need access. An adversary would seek to disrupt marine transport as an asymmetric tactic in peace-like competition as much as they would to establish maritime dominance in an armed conflict. NZDF anticipation of peacetime needs is also partial planning for littoral warfare.[30] Presence matters. It is far easier to build a base of knowledge and respond to events[31] with in-situ personnel than it is to try and figure out what is happening from afar, and then try to gain access in the throes of a fresh disaster or an unfurling armed conflict.

The growth of populations in coastal regions requires operations in cities and towns as well as in rural, unpopulated areas where forces must have the ability to collect information from the population.[32] The modern threat of land-based area denial and anti-access weapons systems, particularly in the littorals of the Indo-Pacific region, requires focus on amphibious operations.[33] Such focus creates the need for the NZDF to establish and sustain human intelligence networks as stand-in and stay-behind units to conduct reconnaissance, prepare landing sites for follow-on forces, and carry out deception and influencing operations to get within the adversary's decision cycle and disrupt its operations.[34]

29 Vego. "On Littoral Warfare", 6.
30 Ibid, 28.
31 United Kingdom Government, *Integrated Operating Concept*, 10.
32 New Zealand Government, *Future Land Operating Concept 2035: Integrated Land Missions,* 57.
33 Galadyk, "Small Boats, Big Mission".
34 Friedman, "First to Fight", 123.

NZDF and RNZN force design requirements

Littoral warfare capabilities are fundamental to NZDF combat operations in the Indo-Pacific region.[35] Maritime geography is still key. Information and technology have not made it possible for forces at sea to entirely avoid or bypass key maritime terrain, therefore enemy systems ashore must be identified and neutralised, in order for a naval commander to manoeuvre. The value of coastwatchers then and now is that they are forward deployed, persistent, and knowledgeable about local patterns of life. If emplaced ashore before an outbreak of hostilities, they would be attuned to subtle changes in the operating environment. The shore-based threats to naval forces operating in the littorals as well as on the high seas require a counter-acting, forward-deployed, shore-based capability that not only collects and rapidly disseminates information across all domains, but also integrates with friendly forces in the delivery of effects.[36]

In-situ forces facilitate manoeuvrability for larger task-organised units. However, they are dependent on engagement with and the cooperation of local governments and populations.[37] Small, forward-deployed NZDF units give the New Zealand Government additional options for meeting its obligations and strategic objectives[38] while serving to deter an adversary and deny them the freedom to manoeuvre in the event of armed conflict. The next Pacific war will be one in which distributed, agile, and innovative forces must be able to rely on relationships formed and knowledge gained before hostilities occur. Establishment of such a capability would mirror similar enterprises undertaken by partner forces, which have recognised the value of keeping specialists and advisors in overseas posts for extended periods. The purpose of doing this is to establish and maintain understanding and appreciation of an increasingly dynamic operating environment.[39]

35 New Zealand Government, *New Zealand Defence Force Maritime Doctrine*, 90.
36 Friedman, 133.
37 Kerg, *Human Geography for Intelligence Advantage*.
38 New Zealand Government, *New Zealand Defence Force Maritime Doctrine,* 111.
39 Winters, "Adapting Across the Spectrum of Conflict", 79.

In an international armed conflict, New Zealand would most likely provide elements as part of larger Australian maritime and ground combat task forces.[40] These combined Australia–New Zealand task units would also be required to integrate and operate with US forces. As NZDF continues to modernise, upgrade, and align its doctrine and forces with those of Australia and the United States, it will be required to develop new capabilities for joint operations that must nonetheless reflect New Zealand's smaller relative capacity. A small, yet persistent forward presence that can build networks, engage with partners, and collect environmental information provides a cost-effective and credible capability [41] and fits NZDF requirements for meaningful contributions to joint, allied, or coalition maritime operations.[42]

Potential of maritime trade operations

Maritime trade operations (MTO) is an RNZNVR capability that has its foundations in naval operations to protect merchant shipping through information collection, communications, convoy control, and coordination with industry.[43] The MTO contribution to coastal surveillance includes the specialised skills needed to protect commercial shipping while supporting naval commanders' freedom to manoeuvre. MTO in the coastal surveillance role can engage directly with host nation authorities to provide support and advocacy for regional maritime security organisations, activities, training, and exercises. This builds partner capacity for protection and self-defence of critical shipping and communications networks.[44] Coastal surveillance operators would be competent in using modern maritime digital information networks. Their familiarity with these systems would make it easier to detect if they are being used as part of an adversary's disinformation operations.[45] Collection efforts would inform the intelligence cycle and would not be not limited to matters of civilian shipping.[46]

To be effective, though, the NZDF operating in the maritime information environment must form good relationships with civil port authorities, marine police, merchant seafarers, and fishing vessel crews, whose knowledge and cooperation are invaluable at all times. Additionally, they are the most deeply affected by the conflicts, tensions, and competition between states in the Indo-Pacific region.[47] Engagement and influence are components of information operations, along with surveillance and collection, and all are integral to irregular warfare.[48] New Zealand government planning clearly calls for better capability in human intelligence,[49] information collection, and maritime surveillance, in order to contribute to and lead operations in the Pacific, including the provision of subject matter experts and trainers.[50] Establishing surveillance operators' familiarity with the region, along with the trade that sustains it, makes them well-suited to provide a close-up and persistent picture of regional patterns of life to decision-makers and planners within the NZDF and the wider New Zealand Government.[51] Forward deployment enables them to become familiar with local conditions and people before an outbreak of hostilities. Their presence can be a deterrent, but if deterrence fails, their presence also enables speed of action.[52]

Surveillance forward deployments

NZDF coastal surveillance operations would monitor, observe, and record patterns of life activity in various ports throughout the region. This could include those that serve as regional shipping hubs (e.g. Suva and Madang), have high volumes of international ship traffic (Majuro, Tarawa, and Pohnpei[53]), are sited along strategic straits and

40 Colton, "Australia, US and NZ Military Cooperation Augurs Well".
41 Hoehn and Smagh, *Intelligence, Surveillance, and Reconnaissance Design for Great Power Competition*, 28.
42 Dickens, *Inquiry into Defence Beyond 2000*, 6.
43 Dussault, *Naval Cooperation and Guidance for Shipping*, 101.
44 Johnston. "Security of Maritime Trade", 8.
45 Landmark and Aronsen, "Traffic Density Measures for Mapping Maritime Patterns of Life", 1.
46 Dussault, *Naval Cooperation and Guidance for Shipping*, 2.
47 Bilms, "Solving for the Missing Element of Maritime Campaigning".
48 Miklaucic, "The Relentless Regularity of Irregular Warfare".
49 New Zealand Government, *Defence Policy*, 19.
50 New Zealand Government, *Defence White Paper*, 52.
51 Brangwin, "Naval Cooperation and Guidance to Shipping in the Contemporary Operating Environment", 12.
52 Till, "The Integration of Naval Power, Grey-Zone Operations, and CSG-21", 23.
53 Long, "New Analysis Identifies World's Largest and Busiest Fishing Ports".

chokepoints (Rabaul and Lae), or possess some characteristics of all three. Deployed or deployable surveillance teams would support host nation partners as the NZDF's maritime civil–military coordination (CIMIC) experts, integrate the intelligence activities of other NZDF personnel posted in the region[54], and protect regional transportation networks and undersea communications systems. Coastal surveillance networks would work across the entire conflict spectrum as a Tier II human intelligence (HUMINT) capability, including within the asymmetric steady state of grey zone conflict.[55] The intelligence and information operations tasks that could be undertaken by the coastal surveillance programme align with some of those contained in universal, joint, and mission-essential task lists compiled by partner militaries and NATO.[56]

As part of this proposed capability umbrella, the coastal surveillance programme would include personnel in New Zealand who could test, implement, and support newer systems such as uncrewed and autonomous aerial and ocean vehicles, applications, databases, encryption, and crowd-sourcing methods of information collection. Personnel currently posted to regional countries as defence advisers and attachés, would see their roles and responsibilities expand to include the provision of additional technical and operational support to coastal surveillance activities. Their participation could include managing local human intelligence collection networks, supporting uncrewed aerial and undersea systems, and analysing local maritime patterns of life.

In addition to MTO personnel, coastal surveillance operators and analysts could be recruited from across NZDF. Officers and other ranks with experience in artillery, communications, engineering, intelligence, hydrography, diving, naval combat systems, and RNZN unrestricted line (GLX) service, would be especially suited to undertake such roles. Trade qualifications would be built upon with additional training in joint fires and targeting, civil affairs, information operations (including cyber operations), reconnaissance and surveillance, self-defence, and patrolling. Deployed personnel would individually, or as part of a small team, be capable of transporting themselves by land and sea, building local HUMINT networks, undertaking surveillance, identifying targets, calling and controlling fires, providing environmental advice and support to incoming forces, and protecting themselves.

Information and surveillance operations would include the collection of data derived from maritime domain awareness and regulatory/governance architecture such as fisheries monitoring, control, and surveillance (MCS) systems, VHF-based automatic identification systems (AIS), and satellite-based long-range identification and tracking (LRIT). Coastal surveillance, as a maritime component of NZDF information operations and intelligence activity, most importantly contributes to *maritime domain awareness* ("What are the parts in this system, and how do they interact?") as well as *maritime situational awareness* ("What is this thing happening in the system right now, and what are we doing about it?"). Understanding these governance systems, along with the use of publicly available platforms, networks, and social media apps, greatly increases NZDF appreciation and understanding of the operating environment and would also be maintained as part of this programme.

In peacetime and in wartime, forward-deployed coastal surveillance capabilities perform an early-warning function by observing and monitoring an adversary's movements and activities in the operating environment, thus helping decision-makers at the strategic level to formulate or adjust plans and policies. Aside from providing valuable presence and support to partners, the capability also enhances situational awareness by providing a layer of "ground truth" physical observation and assessment to independently confirm or rebut information collected by other methods.[57] Operations in peacetime would focus on improving maritime security, including proactive assessments of ports, waterways, ships and cargoes, and cataloguing infrastructure such as roads, bridges, power stations, and submarine

54 Boswell, "The Land Component in the Maritime Domain", 54.
55 Woods and Bailey, *Relational Maneuver*, 44.
56 Schwille, et al. "Online Appendices".
57 Irwin and Wilson. *The Fourth Age of SOF*, 63.

cable landing sites. In the event of natural disasters and other crises, teams would provide on-ground support to operations by performing damage assessments, helping to clear ports and waterways, and preparing sites for the arrival of relief. From their locations in the islands, operators would be able to support long-range surveillance activities that use a variety of uncrewed or autonomous aerial, surface, and subsurface vehicles by refuelling and recharging them, or salvaging and recovering them if they become damaged.[58] Operators would build networks of maritime coastwatchers who could carry out surveillance from vessels at sea, and their networks would liaise with owners of "ships taken up from trade" (STUFT) to augment and support other NZDF operations.

Focus on combat

Coastal surveillance capabilities in wartime would form part of the RNZN's contribution to the ISR needs of the joint force in the littoral environment.[59] NZDF coastal surveillance operators would use their small footprint as an asymmetric advantage to exploit adversaries' weaknesses while supporting shaping activities by maintaining networks established prior to an outbreak of hostilities.[60]

In combat, coastal surveillance operators would carry out site surveys of ports, waterways, beaches, estuaries, and other maritime geographic features necessary for NZDF amphibious and littoral operations. They would form stay-behind networks to provide initial terminal guidance for air and amphibious landing operations and assessments of effects or damage for naval gunfire, standoff, and long-distance strike. As maritime CIMIC subject matter experts, they would ensure civil–military coordination, deconfliction, protection of civilians, and protection of shipping. Operators would support the recovery of personnel and systems, and help host nations detain and safeguard enemy aliens and asylum-seekers.

As enablers of advance force operations, coastal surveillance personnel would carry out ISR tasks within an adversary's weapons engagement zone. They would provide data collected by human sources – the local surveillance network – to update and complement other data collected by electronic, cyber, and space-based platforms and systems. By avoiding direct contact and using local means to merge with the environment, small-footprint teams would be able to carefully observe the adversary's actions. The team would be capable of using joint fires and would serve as the linkage between friendly forces as they move into a particular operating area, providing local knowledge and support.[61] Modern technology gives additional capability to an operator or observer in the maritime information manoeuvre environment. While a WWII coastwatcher's ability to observe and transmit information was limited by the technology of the times, their modern-day equivalents possess much greater capability, speed, and bandwidth. Modern weapons systems and communications capabilities move the fires observer well away from the naval gunline and place them within a long-range strike envelope.[62] Coastal surveillance operations integrated with intelligence and targeting cycles can deliver long-range strike fires to counter shore-based anti-access or area denial weapons systems that can, from increasing distances, threaten friendly naval forces.[63] This capability reflects a trend among partner forces to push the capacity, authority, and responsibility for calling and controlling fires to ever-lower levels.[64]

NZDF activities in the region will require even closer integration with our defence and security partners alongside effective engagement with local populations.[65] A coastwatcher capability would aid coordination between NZDF units and partner forces, such as the Australian Army and US Marine Corps, to support permissive or forcible entry operations. Coastal surveillance operators with maritime trade

58 Sharp, Mahnken, and Sadov. "What's Missing from the Quad's ISR Partnership".
59 Boswell, "The Land Component in the Maritime Domain", 51.
60 United States Government. *Naval Amphibious Capability in the 21st Century*, 33.
61 Friedman, "First to Fight: Advanced Force Operations and the Future of the Marine Corps", 126.
62 Cummings, "Naval Gunfire Liaisons and 21st Century Fires".
63 Gerie Palanca "Calling in Thunder" .
64 Snow. "The Corps has Qualified Joint Fires Observers For Every Squad".
65 Holmgren, "Expanding Cooperative Intelligence, Surveillance, and Reconnaissance with Allies and Partners in the Indo-Pacific", 12.

Two coastwatchers, one of whom is monitoring the radio, in a hut on the Auckland Islands, 1942. Credit: Alexander Turnbull Library, 1/4-066868-G

and hydrography backgrounds would be especially useful in supporting land component requirements for monitoring, assessing, and carrying out operations in complex port environments around which would be located large civilian populations.[66]

Conclusions

The concepts in this essay do not offer comprehensive solutions for New Zealand's larger, more pressing security and defence issues. The capabilities suggested here are limited in scope, tactical in nature, and are reliant on integration with other elements of the NZDF. However, introducing them would relatively quickly and inexpensively enable the NZDF to increase its overseas presence. They would create an overseas "field laboratory" in a permissive environment to test new maritime ISR systems. Most importantly, these capabilities would signal renewed New Zealand commitment to the peace and security of the region.

Persistent, proactive, forward-deployed coastal surveillance networks in peacetime support maritime security activities and are a valuable capability for information collection and intelligence in advance of an international armed conflict. This overall capability would add to the NZDF's understanding and awareness of local conditions without requiring the deployment of major defence assets and units. A coastal surveillance network would not replace or create friction with other, highly capable NZDF units. Rather, it would support and integrate with such units in both the current steady state as well as during periods of armed conflict.[67]

These capabilities will not come easily. NZDF human resources are stretched, and finding even a small number of people for these roles would be difficult. In creating a new programme, the NZDF would have to find the right balance for deployment periods overseas; provide support for families; manage the costs of acquisition and deployment; and support the career advancement needs of assigned personnel

66 McCarthy, "Holding the Door Open".

67 Van Liew, 2021.

and their parent Services. This paper highlights the utility of RNZNVR maritime trade operations as a highly capable option for developing and leading regional coastal surveillance networks. Dipping into the pool of reservists from all three Services for periods of domestic active service and overseas deployment might be one way to partially address these talent management issues.

The RNZN – particularly the MTO branch of the RNZN Reserve – is deeply relevant to coastal surveillance and human intelligence operations in the Pacific islands and Southeast Asia. Expanded RNZN roles in peace and in war can undertake coastal surveillance as part of a wider NZDF information warfare capability. They can enhance NZDF's ability to manoeuvre, support the national interest, and successfully operate across the contemporary asymmetric, irregular, "grey zone" conflict spectrum between peace and war. Second World War Coastwatchers enabled close Allied coordination during the Southwest Pacific campaign and their precedence should be considered to develop NZDF capabilities in the coming years.

References

Anspach, Charles. *Warfighting in Urbanized Coastal Terrain.* Thesis, University of North Carolina, April 27, 2022. https://cdr.lib.unc.edu/concern/honors_theses/6108vm76r

Asian Development Bank (ADB). *Oceanic Voyages: Shipping in the Pacific.* December 2007. https://www.adb.org/publications/oceanic-voyages-shipping-pacific

Australian Government. "Defence Engagement in the Pacific" In *Inquiry into Australia's Defence Relationships with Pacific Nations,* Chapter 2. Joint Foreign Affairs, Defence, and Trade Committee publication, 2022. https://www.aph.gov.au/-/media/02_Parliamentary_Business/24_Committees/244_Joint_Committees/JFADT/Foreign_Affairs_Defence_and_Trade/Defence_-_Pacific/02_Chapter2.pdf?la=en&hash=A92A8A228590F04D71DF70D5D5D376C92D6023F2

Bigelow, Michael. "Allied Intelligence Bureau Plays Role in WWII". US Army, September 1, 2016. https://www.army.mil/article/174480/allied_intelligence_bureau_plays_role_in_world_war_ii

Bilms, Kevin. “Solving for the Missing Element of Maritime Campaigning”. Irregular Warfare Initiative, September 14, 2023. https://www.Irregularwarfare.org/articles/solving-for-the-missing-element-of-maritime-campaigning/

Bilms, Kevin and Christopher Costa. “Look at Great Power Competition Through a Special Operations Lens”. *Defense One*, June 18, 2020. defenseone.com/ideas/2020/06/puttingspecial-operations-lens-great-powercompetition/166241/

Boswell, John. “The Land Component in the Maritime Domain”. *Professional Journal of the Royal New Zealand Navy* 3, no. 1 (2022): 46–55. https://www.nzdf.mil.nz/assets/Uploads/DocumentLibrary/Professional-Journal-of-the-Royal-New-Zealand-Navy-2022-Vol-3-online.pdf

Bradley, Grant. “We Can’t Stand Aside and Say ‘Nothing to See Here’”. *New Zealand Herald,* April 26, 2023. https://www.nzherald.co.nz/nz/nz-navy-chief-on-china-we-cant-stand-aside-and-say-nothing-to-see-here/C23K3E7CRVF4FKQ6P4IICPNACM/

Brangwin, Zoe. “Naval Cooperation and Guidance to Shipping in the Contemporary Operating Environment” [Academic paper]. Ottawa: Canadian Forces College, 2018. https://www.cfc.forces.gc.ca/259/290/402/305/brangwin.pdf

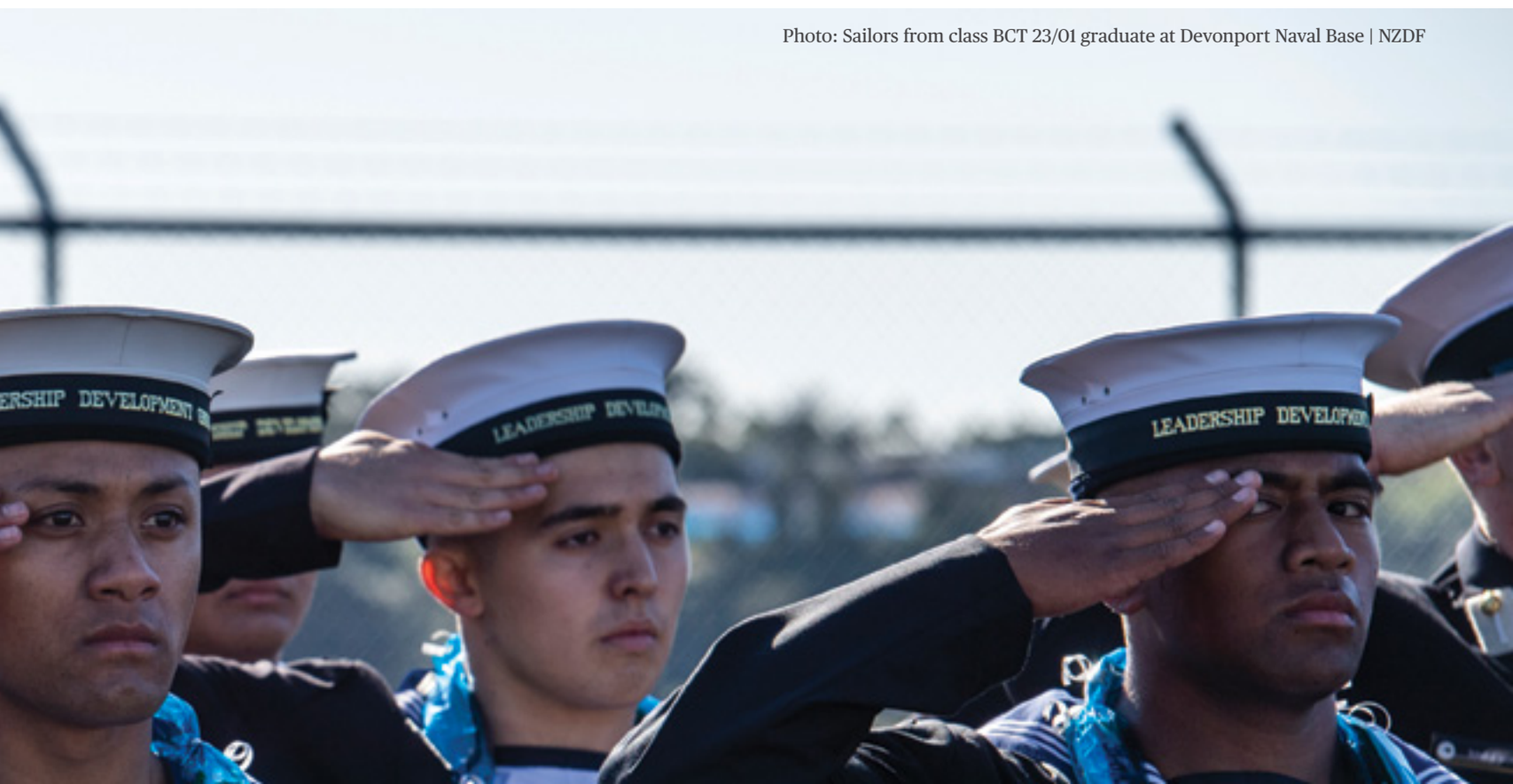
Carroll, Gregory. “Marine Corps Establishes 17XX Information Maneuver Occupational Field”. Marine Corps Public Website, March 9, 2022. https://www.marines.mil/News/NewsDisplay/Article/2961417/marine-corpsestablishes-17xx-information-maneuveroccupational-field/

Colton, Greg. “Australia, US and NZ Military Cooperation Augurs Well”. Lowy Institute, August 3, 2027. https://www.realcleardefense.com/articles/2017/08/03/australia_us_and_nz_military_cooperation_augurs_well_111963.html

Cummings, Alan. “Naval Gunfire Liaisons and 21st Century Fires”. CIMSEC Center for International Maritime Security, August 10, 2022. https://cimsec.org/naval-gunfire-liaisons-and-21st-century-fires/

Dean, Peter J. and Troy Lee Brown. “Littoral Warfare in the Indo-Pacific”. Australian Army Research Centre, April 21, 2022. https://researchcentre.army.gov.au/library/land-power-forum/littoral-warfare-indo-pacific

Photo: Sailors from class BCT 23/01 graduate at Devonport Naval Base | NZDF



Dickens, David. *Inquiry into Defence Beyond 2000: An Independent Review of the Foreign Affairs, Defence & Trade*. Parliamentary Select Committee's Interim Report. Centre for Strategic Studies, Victoria University of Wellinton Working Paper 13/99, 1999. https://www.wgtn.ac.nz/strategic-studies/documents/working-papers/wp-13.pdf

Dussault, Sheyla. *Naval Cooperation and Guidance for Shipping*. [Thesis]. Canadian Forces College, April 2009. https://www.cfc.forces.gc.ca/259/290/297/286/dussault.pdf

Friedman, B.A. "First to Fight: Advanced Force Operations and the Future of the Marine Corps". *Journal of Advanced Military Studies*, 11, no. 2 (2020): 119–126. https://muse.jhu.edu/pub/419/article/796340/pdf

Galadyk, Matthew. "Small Boats, Big Mission". *Naval Institute Proceedings*, 146, no. 6 (June 2020). https://www.usni.org/magazines/proceedings/2020/june/small-boats-big-mission

Gillespie, Oliver. *The Official History of New Zealand in the Second World War: The Pacific.* Wellington: War History Branch, Department of Internal Affairs, 1952.

Hoehn, John, and Nishawn Smagh. *Intelligence, Surveillance, and Reconnaissance Design for Great Power Competition* [Special report]. United States Congressional Research Service, Washington DC, 4 June 2020. https://crsreports.congress.gov/product/pdf/R/R46389

Holmgren, Jacob. "Expanding Cooperative Intelligence, Surveillance, and Reconnaissance with Allied Partners in the Indo-Pacific". *Journal of Indo-Pacific Affairs*, 4, no. 2 (2021): 12–17. https://www.airuniversity.af.edu/JIPA/Display/Article/2473957/expanding-cooperative-intelligence-surveillance-and-reconnaissance-with-allies/

Irwin, Will and Isaiah Wilson III. *The Fourth Age of SOF: The Use and Utility of Special Operations Forces in a New Age.* US Joint Special Operations University Press, JSOU Report 22–1, 2022. https://jsouapplicationstorage.blob.core.windows.net/press/2/22-1.pdf

Johnston, Phil. "Security of Maritime Trade: A Cooperative and Coordinated Approach for the Indo-Pacific Region". *Australian Journal of Maritime & Ocean Affairs, 4*, no. 1 (2012). https://www.tandfonline.com/toc/ramo20/4/1

Kerg, Brian. "Human Geography for Intelligence Advantage". US Naval Institute Proceedings, 147/10, October, 2021. https://www.usni.org/magazines/proceedings/2021/october/human-geography-intelligence-advantage

Landmark, Knut and Morten Aronsen. Density mapping of ship traffic. FFI Report 2016, Norwegian Defence Research Establishment. https://www.ffi.no/en/publications-archive/density-mapping-of-ship-traffic

Layton, Peter. *China's Enduring Grey-Zone Challenge.* Air and Space Power Centre, Canberra, 2022 https://airpower.airforce.gov.au/sites/default/files/2021-07/Chinas%20Enduring%20Greyzone%20Challenge_0.pdf

Long, Tony. "New Analysis Identifies World's Largest and Busiest Fishing Ports". January 5, 2016 Pew Trusts https://www.pewtrusts.org/en/research-and-analysis/articles/2016/01/05/new-analysis-identifies-worlds-largest-and-busiest-fishing-ports

McCarthy, Dayton. "Holding the Door Open". Australian Army Research Centre, June 15, 2023. https://researchcentre.army.gov.au/library/land-power-forum/holding-door-open

Miklaucic, Michael. "The Relentless Regularity of Irregular Warfare". Real Clear Defence, September 16, 2023. https://www.realcleardefense.com/articles/2023/09/16/the_relentless_regularity_of_irregular_warfare_980030.html

New Zealand Government. "New Zealand Military Base in Singapore". Ministry for Culture and Heritage, updated September 13, 2017. https://nzhistory.govt.nz/media/photo/new-zealand-military-base-singapore

New Zealand Government. "Deployments". Beehive, September 17, 2018 http://www.defence.govt.nz/our-work/partner/deployments/

New Zealand Ministry of Defence. *Defence Policy and Strategy Statement*. New Zealand, August 2023. https://www.defence.govt.nz/assets/publications/23-0195-Defence-Policy-and-Strategy-Statement-WEB.pdf

New Zealand Government. *Advancing Pacific Partnerships: A Framework for Defence's Approach to the Pacific.* Ministry of Defence, October 29, 2019 https://www.defence.govt.nz/publications/advancing-pacific-partnerships-2019/

New Zealand Government. New Zealand Defence Force. *Future Land Operating Concept 2035: Integrated Land Missions*. https://www.nzdf.mil.nz/assets/Uploads/DocumentLibrary/Future-Land-Operating-Concept-2035-1.pdf

New Zealand Government. *New Zealand Defence Force Maritime Doctrine.* Chief of Defence Force. https://www.nzdf.mil.nz/assets/Uploads/DocumentLibrary/RNZN-MARITIME-DOCTRINE_first_ed.pdf

New Zealand Government. *Defence White Paper 2010*. Minister of Defence, November 2010. http://www.defence.govt.nz/publications/defence-white-paper-2010-november/

New Zealand Government. *New Zealand Defence Doctrine* NZDD-D. Ministry of Defence. https://www.nzdf.mil.nz/assets/Uploads/DocumentLibrary/NZDDP-D-4th-ed.pdf

Osekowska, Eva et al. *Design and Implementation of a Maritime Traffic Modeling and Anomaly Detection Method*. Blekinge Institute of Technology. Licentiate Dissertation Series No. 2014:09. https://www.diva-portal.org/smash/get/diva2:833998/FULLTEXT01.pdf

Palanca, Gerie. "Calling in Thunder: Naval Intelligence Enabling Precision Long Range Fires". CIMSEC, March 31, 2021. https://cimsec.org/calling-in-thunder-naval-intelligence-enabling-precision-long-range-fires/

Pacific Island Forum. *Boe Declaration Action Plan*. 2018. https://forumsec.org/sites/default/files/2024-03/BOE-document-Action-Plan.pdf

Powles, Anna. "Identity, National Security, and Influence: The Pacific 'Reset' and Shaping New Zealand's Relations with the Pacific Islands". *Development Bulletin*, 82 (2021), 32–36. The Development Studies Network, The Australian National University, Canberra. https://pacificsecurity.net/resource/development-bulletin-82/

Powles, Anna and Joanne Wallis. "Shouldering Their Fair Share?". The Lowy Institute, Jul 23, 2021. https://www.lowyinstitute.org/the-interpreter/shouldering-their-fair-share-anzus-allies-pacific-islands

Roddis, Kendra L. and Alex Tan (2020). Defence Diplomacy: Battling for the Heart of the Pacific. *Outre Terre: European Journal of Geopolitics 58-59*, 327–348

Schwille, Michael et al. "Online Appendices" in *Handbook for Tactical Operations in the Information Environment*. RAND National Security Research Division, 2021. https://www.rand.org/pubs/tools/TLA732-1.html

Sharp, Travis, Thomas G. Mahnken and Tim Sadov. "What's Missing from the Quad's ISR Partnership". *Defense One*, July 2023. https://www.defenseone.com/ideas/2023/07/whats-missing-quads-isr-partnership/388967/

Snow, Shawn. "The Corps has Qualified Joint Fires Observers for Every Squad". *Marine Corps Times*, September 26, 2018. https://www.marinecorpstimes.com/news/your-marine-corps/2018/09/26/the-corps-has-trained-enough-joint-forward-observers-for-every-squad-heres-the-new-way-theyll-train/

Till, Geoffrey. "The Integration of Naval Power, Grey-Zone Operations, and CSG-21: The World Cruise of HMS Queen Elizabeth". *Professional Journal of the Royal New Zealand Navy*, *3*, 2022 14–35. https://www.nzdf.mil.nz/assets/Uploads/DocumentLibrary/Professional-Journal-of-the-Royal-New-Zealand-Navy-2022-Vol-3-online.pdf

United Kingdom Government. *Integrated Operating Concept.* London: Ministry of Defence, August 2021. https://assets.publishing.service.gov.uk/media/612f91b28fa8f50328e2c8f5/Integrated_Operating_Concept_2025.pdf

United States Government. Joint Publication 3-32 *Joint Maritime Operations.* Department of Defense, 2018: 1–6. https://irp.fas.org/doddir/dod/jp3_32.pdf

United States Government. *Marine Air-Ground Task Force Information Environment Operations.* US Marine Corps, 2017. https://www.marines.mil/Portals/1/Publications/MCWP%203-32.pdf

United States Government. *Naval Amphibious Capability in the 21st Century: Strategic Opportunity and a Vision for Change.* Amphibious Capabilities Working Group, US Marine Corps, 27 April 2012. https://defenseinnovationmarketplace.dtic.mil/wp-content/uploads/2018/02/MC_Amphibious_Capabilites.pdf

Van Liew, Michael. "Making Maritime Reconnaissance and Counterreconnaissance Relevant". US Naval Institute, October 2021. https://www.usni.org/magazines/proceedings/2021/october/making-maritime-reconnaissance-and-counterreconnaissance

Vego, Milan. "On Littoral Warfare" *US Naval War College Review*, 68, no. 2 (Spring 2015). https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?httpsredir=1&article=1200&context=nwc-review

Votel, Joseph L. et al., "Unconventional Warfare in the Gray Zone". *Small Wars Journal.* NDU Press, January 17, 2017. https://smallwarsjournal.com/blog/unconventional-warfare-in-the-gray-zone

Widen, J.J. "Naval Diplomacy A Theoretical Approach". *Diplomacy & Statecraft, 22*(4), 715–733, 2011. https://doi.org/10.1080/09592296.2011.625830

Winters, Edward G. "Adapting Across the Spectrum of Conflict: The Role of Naval Special Warfare". *Joint Force Quarterly, 56*, (1st quarter 2010), 76–79. https://apps.dtic.mil/sti/tr/pdf/ADA515140.pdf

Woods, David J. and Paul G. Bailey. *Relational Maneuver: How to Wage Irregular Warfare and MARSOC's Strategic Application.* [Thesis]. US Naval Postgraduate School, December 1, 2018. https://apps.dtic.mil/sti/citations/AD1069839

MICHAEL VREDENBURG

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BOOK REVIEWS

A note from the Book Review Editor, Commander Andrew Dowling, RNZN

The four books reviewed in Volume 4, 2024, are particularly relevant to us as "warriors of the sea". Each identifies security challenges to the West and thus to New Zealand, and each prescribes policy remedies. By providing historical and institutional contexts and examples, they flag strategic mistakes to be avoided as well as breakthroughs to be emulated.

The first book, reviewed by myself, warns of the challenges posed by the rise of China to the Indo-Pacific region and indeed to the western-led rules-based order. The second book, reviewed by Commander Wayne Andrew, takes an omnibus view of multifaceted threats to New Zealand. The third book, reviewed by Lieutenant Commander Marc Griffiths, looks back to the Nazi threat and how Britain successfully met it. The fourth book, reviewed by Commander Alex Trotter, assesses the military decisions made during recent wars.

The policy prescriptions offered by each book are awareness, adaptation, cooperation, and teamwork – military, political, and economic – among the like-minded democracies and among the security experts who lead each government. No single western country, no single leader, no single service can prevail alone against the rising powers of the East that are coalescing to remake the world order in their autocratic image. Western combat strength and readiness can be maintained only through democracies working together.

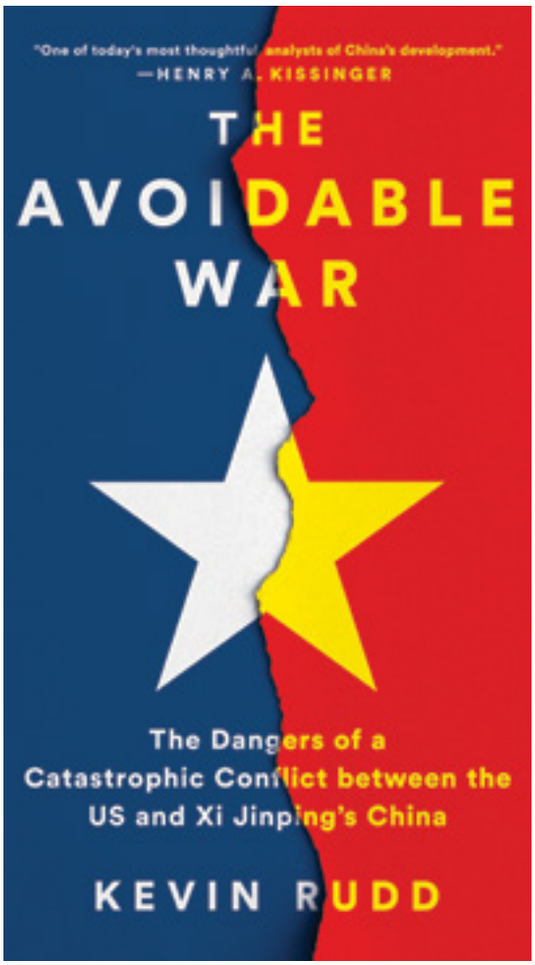
Future volumes of this Journal will offer additional book reviews. Readers are invited to submit a review for Volume 5, 2025. Guidelines may be found on the Next Issue page at the end of this volume. Enquiries may be sent to the Book Review Editor at rnznjournal@gmail.com.

COMMANDER ANDREW DOWLING, RNZN

Joining the Royal Navy in 1999, Commander Andrew Dowling deployed to HMS *Manchester* and HMS *Somerset* in support of Operation Enduring Freedom and HMS *Marlborough* during the Iraq War. He subsequently rose to Flight Commander in the UK Maritime Counterterrorism team, then to Operations Officer aboard HMS *Illustrious*, J5 Planner for the UK Maritime Battle Staff, and was assigned as a carrier strike specialist to the Maritime Warfare Centre. Transferring to the RNZN in 2015, Dowling served as Operational Flight Commander in No. 6 Squadron, RNZAF, then in Ministry of Defence (MoD) Capability Branch as Naval Aviation Capability Manager and Deputy Director Naval Combat and Patrol Force. After this he was posted as Commander of the RNZN's Maritime Operational Evaluation Team before assuming command of the Navy's Maritime Training Group. Dowling, as an acting Captain, commanded RIMPAC 2024's Task Force 173 including a multinational staff of over 30 personnel, eight ships, and associated helicopters and aircraft. Dowling completed the NZDF Advanced Command and Staff course in 2017, and has earned a master's degree in modern warfare from King's College, London and a master's degree in international strategy from Massey University. He has an enduring interest in military history and strategy and has served as this Journal's Book Review Editor since 2019.

The Avoidable War: The Dangers of a Catastrophic Conflict Between the US and Xi Jinping's China

Kevin Rudd
Published by Hachette, Sydney, 2022



As a former prime minister of Australia and a long-term scholar and diplomat who has studied, lived, and travelled extensively in China, Rudd is a uniquely experienced western politician. In this engrossing book, he can authoritatively comment on, and help explain, China's actions in today's global environment.

While this book may not change your political views, it may well change the way you look at and interpret the messages and actions coming out of China. In Rudd's own words, the aim of this timely book is: 'to explain, for a mainly American audience, how the world views now dominant in China and the United States are pushing the two countries toward war; to outline how such a war could be sparked... and to consider what could be done, in realistic terms, to prevent it.' These are lofty goals, and I couldn't help thinking that a US citizen would perhaps not be overly delighted to find this Australian, now ambassador in Washington, telling Americans how it is. However, putting that to one side, this is an informative and, in the main, high quality read. Understanding "the other side of the hill" is Rudd's main aim, one readers from any country can appreciate.

Given the current geopolitical situation, we are all aware of the perilous nature the world finds itself in right now. Since this book was written, the situation has deteriorated rapidly with the war in Ukraine, Israel's operations in Gaza (and retaliations by Iran and Hezbollah in Lebanon, and the Houthis' subsequent disruption of the global maritime trade routes in the Red Sea). Not for quite some time have things looked this rocky. Providing an understanding of how China is or isn't responding and how that response causes friction with the US

is the main strength of this book. The first three quarters of the book are background as to how China contextualises and views this world. But this isn't some dry history lesson, because Rudd always refers to contemporary events and how China's history shapes its ambitions and responses.

Identifying the "10 circles" of Chinese interests allows Rudd to segment the book logically, and to cleverly work from micro to macro as the chapters develop, building the reader's understanding in layers as the book unfolds. Of particular interest to maritime readers are the third and fourth circles that deal with trade and the fundamental necessity of the maritime domain in supporting China's ambitions. In the seas near and far, China applies a comprehensive strategy of military modernisation and diplomatic overtures to secure both trade agreements and foreign basing rights.

In Chapter 10, Rudd discusses China's seventh circle, its maritime periphery, and how securing it across the Western and Southwestern Pacific as well as the Indian Ocean is a non-negotiable objective for China as it expands its influence. This strategy of securing its maritime periphery is evident nearby as China seeks to influence Pacific island nations such as the Solomon Islands with a blend of hard and soft power influences via offers of money, infrastructure projects, and police protection. NZDF and RNZN readers should take special note of this chapter.

Perhaps the most worrying aspect (depending on your opinion of the merits of democracy) is Rudd's observation that, since the Trump presidency, China's leaders now believe that, in the eyes of many of the world's countries, China is a more dependable, logical, and valuable partner than the US. The fact that many countries already maintain predominant or significant economic relations with China only reinforces this view. With the US becoming increasingly split politically and potentially becoming more isolationist, the Chinese leadership, in their own words, regard the present as a 'period of strategic opportunity' as they seek to consolidate and expand their global influence.

Overall, I enjoyed the book and think it is accessible for readers at all levels. However, it can at times seem a little repetitive. Whilst Rudd postulates that China and the US could rub along together via what Rudd terms as 'managed strategic competition' he doesn't articulate how such a system could work in today's world, or the consequences of such an approach for other countries around the globe. Nevertheless, the way the book builds from micro to macro analysis and links the chapters together is persuasive. So is Rudd's emphasis on trade and the maritime domain, which is often ignored by other analysts.

Above all, I found value in the book's background of, and insights into, the Chinese political system, particularly the ways it perceives other nations' actions, which differ from our perceptions, sometimes being diametrically opposite. Nevertheless, Rudd offers hope that if the leaders of nations talk to one another rather than glare, then there could be a peaceful way forward for the world. All it requires is moral courage on the part of global leaders.

Reviewed by Commander Andrew Dowling, RNZN.

Commander Dowling is currently attached to HQ JFNZ and his next posting is Naval Adviser in Canberra.

State of Threat: The Challenges to Aotearoa New Zealand's National Security

Edited by Wil Hoverd and Deidre Ann McDonald
Published by: Massey University Press, Auckland, 2023

State of Threat presents a series of comprehensively researched and argued perspectives that will help readers to more fully understand current and future threats to Aotearoa New Zealand's security. In their introduction, Wil Hoverd and Deidre Ann McDonald, scholars at Massey University's Centre for Defence and Security Studies, position their book within the current security environment by summarising what has happened in Aotearoa New Zealand since 2018 to make New Zealanders feel less safe than they used to. They surmise that recent events (and their consequences) including the Christchurch terror attack, the eruption of Whakaari White Island, the COVID-19 pandemic, the protests in the grounds of Parliament House, climate change, disinformation, cyber-attacks, extreme weather events, supply chain interruptions, US–China competition, and Russia's invasion of Ukraine have all contributed to a growing realisation that we are not as secure as we used to be, and that we should start to take our national security more seriously. Their overarching message is that the discussion about security both in New Zealand and beyond needs to be broadened and deepened.

How Aotearoa New Zealand could do this and why we should is the theme addressed by the 17 contributing authors, who include academics, public servants, analysts, defence personnel, scientists, researchers, and PhD candidates. The authors are from diverse backgrounds and perspectives and do not always agree. Hoverd and McDonald acknowledge this point. They argue that robust and informed debate about our national security can be achieved only if a range of competing and

conflicting views are heard and understood by the public, who can then make more nuanced decisions about how to live (in ways that combat climate change or protect their cyber security, for example) and how to vote (for example, to ensure the best government is in place to safeguard our security). So the book represents a refreshing antidote to "post-truth politics" as the editors deliver not a simplistic and curated message but rather a range of thought-provoking and debatable perspectives.

The book is divided into four parts. Part 1 offers five perspectives on offshore threats and opportunities, including great power competition, the war in Ukraine, the NZDF's workforce shortages, maritime trade security, and supply chain resilience. The four chapters in Part 2 focus on Aotearoa New Zealand's economic, social, and environmental security by examining submarine cables, the domestic drug trade, intelligence gathering for biosecurity purposes and the use of artificial intelligence in biosecurity. Part 3, on the themes of governance and extremism, begins with a chapter on the transparency and accountability of the government when engaged in intelligence collection activities. The next three chapters provide an analysis of national security speeches, a summary of terrorism in New Zealand and how we are preparing to manage it, and an examination of the role and identity of women in extremist groups. Part 4 brings together key themes to examine options for the future, using examples such as reframing Russia's invasion of Ukraine from self-determination and territorial integrity perspectives, the security implications of digital currencies, and lessons from Poland's frontline experience, to inform what New Zealand should do to prepare for future threats. It concludes with lessons for New Zealand and the Pacific islands.

While RNZN readers may gravitate towards the chapters on maritime trade security and the vulnerability of submarine cables and maritime supply chains as most relevant to the RNZN, I encourage readers to study every contribution. Each provides a fresh perspective on current security threats and builds towards an excellent summary by the editors, which concludes that national security is a matter for all New Zealanders to engage with, because threats to it affect us all. The more voices in the conversation, and the more that assumptions can be debated and tested, the richer the solutions will be. Editors Hoverd and McDonald encourage readers to identify what values we, as a nation, will draw upon, and prioritise, when called to defend New Zealand.

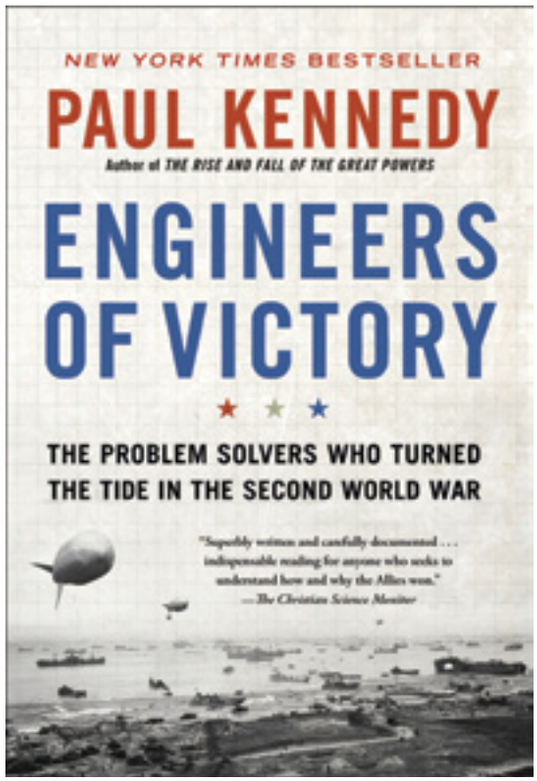
As Tony Lynch, Chair of the Centre for Defence and Strategic Studies, says in his Foreword, we all have a role to play. National security issues need to be understood and addressed by whole-of-society action. What should New Zealanders do to play a part? I suggest that a good start after reading this book would be to recommend it to others so that more people can better understand current and future security threats facing Aotearoa New Zealand. We need to have conversations with a broad cross section of society about why the NZDF and our other security institutions are essential to achieving our national interests.

Reviewed by Commander Wayne Andrew, RNZN.

Commander Wayne Andrew is currently Naval Adviser in the New Zealand High Commission, London, and Defence Attaché to Germany and the Netherlands.

Engineers of Victory: The Problem Solvers Who Turned the Tide in the Second World War

Paul Kennedy
Published by: Penguin Books, London, 2013



History professor Paul Kennedy offers readers a broad definition of "engineers" as skilful and adaptive problem solvers. He structures his book around five key problems that the Allies faced during the critical eighteen months of the Second World War (January 1943–July 1944), the people who worked to solve them, and the solutions they developed. The five problems, to which he devotes a chapter each, were:

- how to get convoys safely across the Atlantic;
- how to win command of the air;
- how to stop a Blitzkrieg;
- how to seize an enemy-held shore; and
- how to defeat the "tyranny of distance".

Kennedy first reminds the reader of the geopolitical situation as it stood at the time of the Casablanca Conference (Stalin, Churchill, and Roosevelt's meeting in January 1943). The lead "engineers" (in reality a mix of engineers, strategists, industrialists, and military commanders) are then introduced and their various proposals identified. Finally, the solutions they evolved and implemented are detailed and analysed. As the volume progresses, Kennedy shows how the solutions of earlier problems supported the resolution of later problems. For example, the D-Day landings covered in Chapter 4 – "How to seize an enemy-held shore" – would not have been possible without the solutions described in Chapter 1 – "How to get a convoy safely across the Atlantic" – or Chapter 2 – "How to win command of the air".

The underlying enabling factor that Kennedy identifies is 'a military-political culture that allowed problem solving to go ahead' (p. 369). It was a learning environment that encouraged experimentation that

allowed the engineers to progress towards a solution rather than pausing and over-analysing the problems. This mindset was highlighted by advice from Churchill: 'Don't worry too much about the problems, for the problems will sort themselves out – that is, a way will be found, step by step' (cited on page 370). The solutions were not developed straight away, but learned through extensive tests and trials. Some of the tests would prove costly, but had longer term benefits for planning for future operations. The casualties and failures of the Dieppe Raid directly resulted in improvements to the plans for D-Day. The Allies also learnt that they could adapt solutions to similar problems in different locations. Using "geography-informed strategy", the solutions for amphibious landings in the Pacific were different from the amphibious landings on the coast of Europe, but they had transferrable elements.

By starting with five key problems, Kennedy is better able to present the range of progressive methods that contributed to solutions for each problem, rather than a single technique. Using the combination of interrelated solutions, he ably presents his argument that 'the historian who overemphasizes any one of these aspects distorts the larger, holistic account'.

However, there are omissions. The work of the Western Approaches Tactical Unit developing anti-submarine tactics in the Battle of the Atlantic is not mentioned. Though not solely responsible for countering the U-Boat threat, as some recent works seem to imply, the tactics the Unit developed did contribute to the overall defeat in the U-Boat menace. Also, some of Kennedy's analyses are relatively shallow and repeat information between chapters when similar solutions are discussed. On the positive side, the extensive referencing does provide ample sources to guide the interested reader's deeper delving into any topic that sparks their imagination.

Kennedy appears to have a particular bugbear about the attention that intelligence operations (Ultra/Enigma, spies, and signals intelligence) enjoy in many analyses of the Second World War. Responding to the popular view that Ultra and Enigma code breaking shortened the war by up to three years, Kennedy tersely asserts, 'It is not provable' (p. 358).

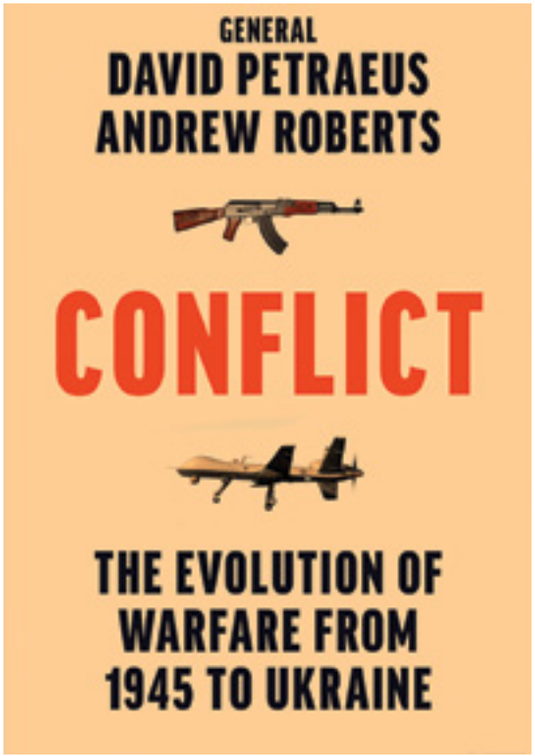
This is not a book about men in dust coats working in laboratories, experimenting on new weapons, dubious technologies, or canny devices. Instead, Kennedy looks at solution development as a fluid combination of the strategic, operational, tactical and technical aspects. Alternative works exist that do focus on specific technical breakthroughs, but few combine the layers and nuances that contribute to solution development that Kennedy does. While the writing style might not appeal to all readers, this book is a valuable and well-researched study for those interested in military history, solution development methodology, or the impacts of culture on organisational outcomes.

Reviewed by Lieutenant Commander Marc Griffiths, RNZN.

Lieutenant Commander Marc Griffiths is currently Class Manager, Naval Support Force, within the Defence Logistics Command (Maritime).

Conflict: The Evolution of Warfare from 1945 to Ukraine

by General David Petraeus and Andrew Roberts
Published by HarperCollins Publishers: New York, 2023



This book distinguishes itself from the avalanche of literature on the war in Ukraine by instead looking at the history of warfare in the last 80 years. Examining prior conflicts, it provides a perspective of the evolution of warfare in the post-WWII period. The conflicts selected range from wars in Korea, Vietnam, and the Falklands to lesser-known conflicts such as the Dhofar War in Oman and Operation Just Cause in Panama. Each selection includes a vignette of the conflict, then moves to the lessons gleaned and how they shaped the evolution of warfare. For example, Egypt applied the harsh lessons from the Six Day War to achieve success – initially at least – in the Yom Kippur War six years later. However, some lessons were forgotten, the most notable being the US Army's failure to adopt and apply the counter-insurgency doctrine so painfully learned in Vietnam to its campaigns in Iraq and Afghanistan, with adverse consequences.

While unique conclusions are drawn from each conflict, the two main threads that are woven throughout are an evaluation of the effectiveness of strategic leadership, and the uncertain nature of conflict from a grand strategy perspective. Analysis of strategic leadership is where the book really shines. British historian Andrew Roberts displays considerable talent in evaluating military leadership, building on his acclaimed biographies of Napoleon and Churchill. This is fused with the vast practical experience of General Petraeus who was a key strategic leader in both Iraq and Afghanistan. The authors distil four key requirements of effective strategic leadership: 1) Getting "the big strategic idea" right, 2) the ability to effectively communicate the big idea, 3) the drive to implement the big idea, and 4) the capacity to critically evaluate the concepts and refine them as necessary. An example of this done right is Mao Zedong's leadership during the Chinese Civil War; an example of

poor execution was General MacArthur's generalship in the Korean War.

The second recurring theme concerns Clausewitz's warning to generals and politicians alike that they must be certain about the 'kind of war on which they are embarking'. It's no surprise that most successful outcomes such as the British campaign to reclaim the Falkland Islands have clearly defined conditions for success, combined with a grounded strategic awareness regarding the limits of the conflict. Time and time again conflicts unravel where one or both belligerents find themselves fighting in a very different war than what they initially signed up for, with the US and later coalition experiences in Vietnam, Iraq, and Afghanistan criticised in this regard.

The analysis deepens during the 21st century campaigns in Iraq and Afghanistan, predominantly due to General Petraeus' intimate involvement in both. Here the authors embark on a detailed analysis of the success and failures of each conflict, with the former often attributed to high quality leadership and initiatives at the operational level, and the latter put down to various factors including a lack of will and meddling by politicians. Notable also are the recurring themes of a lack of understanding of the cultural and societal aspects of nations the coalitions are trying to reshape. The standout example is US intervention in Iraq, which resulted in catastrophic decisions and policies that fatally undermined a cohesive central administration in the wake of the removal of the Saddam regime.

Significant time is spent on the Ukrainian conflict, where the leaderships of Zelensky and Putin are evaluated and contrasted, using the above-cited four requirements model. Zelensky is graded positively as 'Churchillian' in his epitomising of strategic leadership values, while Putin is roundly criticised for 'communicating his strategy from an impractically long white table'. Also emphasised is how Putin and his cabinet failed in the fundamental Clausewitzian understanding of the type of war on which they were about to embark. Russia leaders expected that a rapid decapitation strike would crush the allegedly rotting Ukrainian political system, but instead found themselves drawn into a grinding conflict with a determined opponent backed by NATO and the western defence industry complex.

The final chapter concerns observations of future warfare. These range from the prevalence of robotics and AI on the battlefield to the growing influence of commercial entities and industry titans. Other examples include Mossad's assassination of an Iranian nuclear scientist in 2020 using an autonomous machine gun and Elon Musk's strict conditions for usage of Starlink in Ukraine, which demonstrates the growing influence of the commercial sector. The rising importance of open-source intelligence in the age of social media also features heavily, with a section describing how the fusing of public reports and footage of Russian formations into an intelligence plot significantly contributed to the defence of Kyiv in the opening phase of the war. The authors also note the dizzying pace of advances in cyber, information, and drone warfare, manifested now in Ukraine.

We are reminded however that warfare can and frequently does revert to more primitive methods, brought home by the examples such as the prevalence of the machete in the Rwandan genocide, and the heavy use of artillery, trenches, and static defence lines in Ukraine. While not explicitly stated, echoing throughout the book is Clausewitz's observation that while the character of war is rapidly and continuously evolving, the fundamentals of the nature of war remain largely unchanged.

While overall I found this book a thoroughly enjoyable and insightful read, I would respectfully criticise the sections where Petraeus himself becomes a central part of the narrative. While his personal insights and anecdotes are fascinating, he avoids applying the above four-element strategic leadership assessment to himself. Instead, he focusses on his peers and subordinates, and points out failures in the political and bureaucratic structures he had to work within. It was a missed opportunity not to turn the powerful microscope of strategic leadership analysis into a mirror.

Regardless, this is a fascinating and accessible read that I recommend to anyone interested in both contemporary military history and the evolution of warfare.

Reviewed by Commander Alex Trotter, RNZN.

Commander Alex Trotter is currently Commanding Officer and Embarked Flight Commander of No. 6 Squadron RNZAF.

INVITATION TO CONTRIBUTE TO THE NEXT ISSUE AND GUIDELINES FOR CONTRIBUTORS

The editors of the *Professional Journal of the Royal New Zealand* Navy welcome submissions to the next issue, Volume 5, 2025.

Guidelines for submissions are as follows:

- Submissions should be broadly consistent with the aims of the Journal, which are to inform debate on New Zealand's maritime and naval policies and to encourage both strategic and policy-relevant thinking about New Zealand's wider security context.
- Draft articles should normally not exceed 4,500 words in length. Shorter articles, commentaries, and book reviews are welcome. All lengths are negotiable in the interests of equity, consistency, relevance, and readability.
- Accurate and relevant footnotes and a references list should be included as appropriate, and should include only sources cited in the article. These should be consistent with the *Chicago Manual of Style's* "Shortened Notes" and "Bibliography" styles, accessible at https://www.chicagomanualofstyle.org/tools_citationguide/citation-guide-1.html Online references should include a hyperlink. Potential contributors should consult earlier volumes of this Journal for examples.
- Accompanying illustrations should be high resolution (300 dpi minimum at full scale) and should be sent as separate files. Captions and sources should accompany the illustrations.
- An official biography and high resolution portrait photo should be appended to submissions.
- Submissions to the 2025 issue of this Journal should be emailed to the following e-dress by the end of January 2025, and preferably earlier: rnznjournal@gmail.com
- Once drafts are submitted, they may be edited for consistency with the Journal's themes and formats, but authors will be consulted for approval of significant editorial alterations.

Members of the Editorial Working Committee welcome communications with potential authors at any time, and stand ready to help authors shape their provisional topics into acceptable articles or reviews.

Let's keep in touch.

rnznjournal@gmail.com

Image: Sailors from class BCT 23/01 graduate at Devonport Naval Base | NZDF

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